EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1353872	secondary rechargeable lithium	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:01
L2	112800	1 near3 (battery batteries electrochemical)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:02
L3	101	2 and (oxygen same (ceria zirconia yttria))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:12
L4	13	("3655845" | "3707589" | "4263381" | "4294898" | "4358516" | "5137853" | "5415127").PN. OR ("6117807").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/05/18 12:09
L5	64	lithium with oxygen with conducting	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:10
L6	94	lithium with (oxygen near7 conduct$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:10
L7	530	2 and (oxygen with conduct$4 with (electrode$1 anode$1 cathode$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:15
L8	400	7 and ("429"/$.ccls. h01m$.ipc.)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:13
L9	58	7 and ("429"/$.ccls. h01m$.ipc.)	EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:14
L10	68	2 and ((oxygen near2 ion$1) with conduct$4 with (electrode$1 anode$1 cathode$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:15
L11	13	10 not (fuel adj cell$1)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:16
L12	1	2004-360606.NRAN.	DERWENT	OR	OFF	2006/05/18 12:16

EAST Search History

L13	2	(US-6117807-$).did. or (JP-2004127678-$).did.	USPAT; JPO	OR	OFF	2006/05/18 12:16

Banks, Kendra 190509

From: GREGG CANTELMO [gregg.cantelmo@uspto.gov]
Sent: Thursday, May 18, 2006 12:08 PM
To: STIC-EIC1700
Subject: Database Search Request, Serial Number: 10/670484

```
Requester:
      GREGG CANTELMO (P/1745)
Art Unit:
      GROUP ART UNIT 1745
Employee Number:
      75777
Office Location:
      REM 06C81
Phone Number:
      (571)272-1283
Mailbox Number:
      REM 6C81

Case serial number:
      10/670484
Class / Subclass(es):
      429/218.1, 232
Earliest Priority Filing Date:
      9/26/03
Format preferred for results:
      Paper
Search Topic Information:
      Please search the claimed and disclosed electrode material for a secondary battery,
notably lithium class.  See paragraph [0054] of the corresponding PG PUB document which
lists the genus of mixed oxygen ion and electron conductors (US PG PUB 2004/0157123).

Please be sure to exclude fuel cells from the search.
Special Instructions and Other Comments:
```

```
=> file reg
FILE 'REGISTRY'
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
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=> display history full l1-

     FILE 'HCAPLUS'
L1         55341 SEA SASAKI ?/AU
L2         37659 SEA TAKEUCHI ?/AU
L3         29822 SEA NAKANO ?/AU
L4        103098 SEA KOBAYASHI ?/AU
L5           246 SEA UKYO ?/AU
L6            16 SEA L1 AND L2 AND L3 AND L4 AND L5
                 SEL L6 1-16 RN

     FILE 'REGISTRY'
L7            30 SEA (193214-24-3/BI OR 7782-42-5/BI OR 193214-22-1/BI OR
L8             1 SEA L7 AND CE/ELS

     FILE 'HCA'
L9             6 SEA L8
L10       220389 SEA BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY?
                 OR GALVANI? OR WET OR DRY OR PRIMARY OR SECONDARY)(2A)(CE
                 LL OR CELLS) OR DRYCELL? OR WETCELL?
L11        56374 SEA FUELCELL? OR FUEL?(2A)(CELL OR CELLS)
L12            1 SEA L9 AND L10
L13            1 SEA L9 AND (52 OR 72)/SC,SX

     FILE 'REGISTRY'
L14         2333 SEA (CE(L)ZR(L)O)/ELS
L15          149 SEA L14  (L) 3/ELC.SUB
                 E CERIA/CN
L16            1 SEA CERIA/CN
                 E ZIRCONIA/CN
L17            1 SEA ZIRCONIA/CN
L18          279 SEA CEO2
L19          997 SEA O2ZR OR OZR
L20            8 SEA L18 AND L19

     FILE 'HCA'
L21         1566 SEA L15
L22        32509 SEA L16 OR CERIA# OR CEO2 OR (CERIUM# OR CE)(W)(OXIDE#
                 OR DIOXIDE#)
L23       132160 SEA L17 OR ZIRCONIA# OR ZRO OR ZRO2 OR (ZIRCONIUM# OR
                 ZR)(W)(OXIDE# OR DIOXIDE# OR MONOXIDE#)
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L24            8 SEA L20
L25            1 SEA L24 AND L10
L26            1 SEA L25 AND (52 OR 72)/SC,SX
L27           25 SEA L21 AND L10
L28            4 SEA L27 NOT L11
L29          103 SEA L21 AND (52 OR 72)/SC,SX
L30           43 SEA L29 NOT L11
L31        11441 SEA L22 AND L23
L32          611 SEA L31 AND L10
L33          131 SEA L32 NOT L11
L34        22978 SEA L16
L35        91033 SEA L17
L36           99 SEA L33 AND L34
L37          111 SEA L33 AND L35
L38           90 SEA L36 AND L37
L39        13858 SEA ELECTRON#(2A)(OXYGEN# OR O2 OR O)
L40          567 SEA (INTERCALAT? OR DECALAT?)(3A)(OXYGEN# OR O2 OR O)

     FILE 'REGISTRY'
L41            1 SEA 64417-98-7

     FILE 'HCA'
L42         4714 SEA L41
L43            7 SEA L38 AND L42
L44            0 SEA L38 AND L39
L45            0 SEA L38 AND L40
L46            1 SEA L27 AND L39
L47            1 SEA L27 AND L40
L48            1 SEA L30 AND L39
L49            2 SEA L30 AND L40
L50            5 SEA L32 AND L39
L51            0 SEA L32 AND L40
L52           29 SEA L31 AND L39
L53            0 SEA L31 AND L40
L54           22 SEA L52 NOT L11
L55           18 SEA L12 OR L13 OR L25 OR L26 OR L28 OR L43 OR L46 OR L47
                 OR L48 OR L49 OR L50
L56           83 SEA (L27 OR L30 OR L54) NOT L55
L57           17 SEA L55 AND 1840-2003/PRY,PY
L58           62 SEA L56 AND 1840-2003/PRY,PY



=> file hca
FILE 'HCA'
```

=> d l57 1-17 cbib abs hitstr hitind

L57 ANSWER 1 OF 17 HCA COPYRIGHT 2006 ACS on STN
142:272921 Electrochemical sensor. Grant, Robert Bruce (The BOC Group PLC, UK). PCT Int. Appl. WO 2005019817 A1 20050303, 31 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2004-GB3370 20040805. PRIORITY: GB 2003-19455 20030819.

AB An org. contaminant mol. sensor is described for use in a low oxygen concn. monitored environment. The sensor comprises an **electrochem. cell**, which is formed from a measurement electrode coated with (or formed from) a catalyst having the ability to catalyze the dissociative adsorption of the org. contaminant mol., the electrode being positioned for exposure to the monitored environment, a ref. electrode coated with (or comprised from) a catalyst selected for its ability to catalyze the dissocn. of oxygen to oxygen anions, the ref. electrode being positioned within a ref. environment, and a solid state oxygen anion conductor disposed between and bridging the measurement and ref. electrodes, wherein oxygen anion conduction occurs at or above a crit. temp., Tc. Sealing means are provided for sepg. the ref. environment from the monitored environment. Means are also provided for controlling and monitoring the temp. of the cell, and for controlling the elec. current (Ip) flowing between the ref. and measurement electrodes. At temps. (Tads) below Tc, org. contaminant mols. are adsorbed onto and dissocd. at the surface of the measurement electrode leading to the build up of carbonaceous deposits at the surface thereof. At temps. (Ttit) above Tc, an elec. current (Ip) is passed between the ref. and measurement electrode thereby to control the no. of oxygen anions passing from the ref. electrode to the measurement electrode to oxidize the carbonaceous deposits formed at the surface thereof and the formation of carbon dioxide.

IT **1314-23-4D**, **Zirconia**, yttria-stabilized
64417-98-7, Yttrium **zirconium oxide**
(org. contaminant detn. in low oxygen concn. monitored environment by electrochem. gas sensor system)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)

O═Zr═O

RN 64417-98-7 HCA
CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **1306-38-3D**, **Ceria**, gadolinium doped
(solid state oxygen anion conductor; org. contaminant detn. in low oxygen concn. monitored environment by electrochem. gas sensor system)
RN 1306-38-3 HCA
CN Cerium oxide (CeO_2) (8CI, 9CI) (CA INDEX NAME)

O═Ce═O

IC ICM G01N033-00
ICS G01N027-406; G01N027-407
CC 80-2 (Organic Analytical Chemistry)
IT Contamination (electronics)
Decomposition catalysts
Electrochemical cells
Electrodes
Heaters
Ionic conductors
Thermocouples
(org. contaminant detn. in low oxygen concn. monitored environment by electrochem. gas sensor system)
IT 1314-08-5, Palladium oxide (PdO) **1314-23-4D**, **Zirconia**, yttria-stabilized 1314-36-9D, Yttria, **zirconia** stabilized by 1317-38-0, Cupric oxide, uses 1317-39-1, Cuprous oxide, uses 7439-88-5, Iridium, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses **64417-98-7**, Yttrium **zirconium oxide**
(org. contaminant detn. in low oxygen concn. monitored environment by electrochem. gas sensor system)
IT 7440-54-2D, Gadolinium, doped **ceria**
(org. contaminant detn. in low oxygen concn. monitored environment by electrochem. gas sensor system)
IT **1306-38-3D**, **Ceria**, gadolinium doped
(solid state oxygen anion conductor; org. contaminant detn. in low oxygen concn. monitored environment by electrochem. gas sensor system)

L57 ANSWER 2 OF 17 HCA COPYRIGHT 2006 ACS on STN
140:360277 Secondary **battery**. Sasaki, Iwao; Takeuchi, Yoji; Nakano, Hideyuki; Kobayashi, Tetsuro; Ukyo, Yoshio (Toyota Central Research and Development Laboratories, Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2004127678 A2 20040422, 13 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-289128 20021001.

AB The **battery** has a cathode and an anode, both comprising a solid active mass, and an electrolyte layer between the 2 electrodes; where the cathode and/or the anode solid active mass comprises an **electron-O** ion mixed conductor capable of **intercalating** and **decalating** **O** ion or **O**.

IT **609337-34-0**, Cerium zirconium oxide (Ce2Zr2O7.5)
(electrodes contg. **electron-oxygen** ion mixed conductors for secondary **batteries**)

RN 609337-34-0 HCA

CN Cerium zirconium oxide (Ce2Zr2O7.5) (9CI) (CA INDEX NAME)

FRPR of Inst. App

Component	Ratio	Component Registry Number
O	7.5	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

IC ICM H01M004-02
ICS H01M004-58; H01M010-40

CC **52-2** (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary **battery** electrode active mass; electrode active mass **electron oxygen** ion mixed conductor

IT **Battery** electrodes
Secondary **batteries**
(electrodes contg. **electron-oxygen** ion mixed conductors for secondary **batteries**)

IT 7440-06-4, Platinum black, uses 64417-98-7, Yttrium zirconium oxide **609337-34-0**, Cerium zirconium oxide (Ce2Zr2O7.5)
(electrodes contg. **electron-oxygen** ion mixed conductors for secondary **batteries**)

L57 ANSWER 3 OF 17 HCA COPYRIGHT 2006 ACS on STN
140:257304 Thermodynamic stability of metastable tetragonal t'-Ce0.5Zr0.5O2 phase in the CeO2-ZrO2 system. Yao-matsuo, Shinya Otsuka; Yao, Takayuki; Omata, Takahisa (Department of Materials Science and Processing, Graduate School of Engineering, Osaka University, Suita, 565-0871, Japan). High Temperature Materials and Processes (London, United Kingdom), 22(3-4), 157-164 (English) **2003**. CODEN: HTMPEF. ISSN: 0334-6455. Publisher: Freund

Publishing House Ltd..

AB According to the XRD anal. and emf. measurements employing a solid **electrochem. cell**, we have compared the thermodn. stabilities of metastable t'-Ce0.5Zr0.5O2 phase, ZrO2-based monoclinic and CeO2-based cubic phases (m+c) mixt., and ZrO2-based tetragonal and CeO2-based cubic phases (t+c) mixt. The present expts. have confirmed that the t' phase is metastable at higher temps. than 1373 K, and the stable state is (t+c) mixt. The t' phase is metastable at lower temps. than 1173 K, and the stable state is (m+c) mixt. These results are consistent with the equil. phase diagram of CeO2-ZrO2 system. According to the emf. measurements, it was found that the thermodn. stability of the t' phase lies between those of (t+c) and (m+c) at lower temps. than 1173 K. It was concluded that the t' phase is metastable, but its thermodn. stability is close to those of (t+c) and (m+c).

IT **65453-23-8**, Cerium zirconium oxide
(mixed phases; thermodn. stability of metastable tetragonal t'-Ce0.5Zr0.5O2 phase in CeO2-ZrO2 system)

RN 65453-23-8 HCA

CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

IT **53169-24-7**, Cerium zirconium oxide (Ce0.5Zr0.5O2)
(tetragonal phase; thermodn. stability of metastable tetragonal t'-Ce0.5Zr0.5O2 phase in CeO2-ZrO2 system)

RN 53169-24-7 HCA

CN Cerium zirconium oxide (CeZrO4) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

CC 57-2 (Ceramics)
Section cross-reference(s): 68, 69

IT **65453-23-8**, Cerium zirconium oxide
(mixed phases; thermodn. stability of metastable tetragonal t'-Ce0.5Zr0.5O2 phase in CeO2-ZrO2 system)

IT **53169-24-7**, Cerium zirconium oxide (Ce0.5Zr0.5O2)
(tetragonal phase; thermodn. stability of metastable tetragonal

t'-$Ce_{0.5}Zr_{0.5}O_2$ phase in CeO_2-ZrO_2 system)

L57 ANSWER 4 OF 17 HCA COPYRIGHT 2006 ACS on STN
140:95274 Nanoscale carbon-containing dispersions and their polymerizable compositions, moldings, and manufacture. Shimoyama, Tadashi; Yokota, Hiroshi; Takeda, Kazunori; Fujiwara, Kunio; Takato, Chikako (Ebara Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2004018754 A2 20040122, 13 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-178067 20020619.

AB Nanoscale C materials, which may have been dispersed or suspended in solvents upon radiation irradn., and polymerizable materials are irradiated with radiation to give compns. contg. unpolymd. monomers, subjected to be supported on or adhered to substrates, and polymd. by irradiating radiation to give nanoscale C-contg. macromol. compds. on the substrates. Thus, a THF soln. of 1 g C nanotube was mixed with 50 g THF soln. of acrylic acid and irradiated with 10 kG/h .gamma.-ray for 5 h. When the viscosity of the solvent reached 1 Pa-s, a polyethylene fiber-based nonwoven fabric was impregnated with the soln. and exposed to 1 kGy/h .gamma.-ray for 5 h to give a nonwoven fabric supporting thereon C nanotube-deposited poly(acrylic acid).

IT **1306-38-3, Ceria**, uses **64417-98-7**, Yttrium **zirconium oxide**
(substrate; nanoscale carbon-contg. dispersions and their polymerizable compns., moldings, and manuf.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO_2) (8CI, 9CI) (CA INDEX NAME)

RN 64417-98-7 HCA

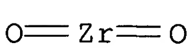
CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **1314-23-4, Zirconia**, uses
(yttria-stabilized, substrate; nanoscale carbon-contg. dispersions and their polymerizable compns., moldings, and manuf.)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)



IC ICM C08F002-44
ICS C01B031-02; C08F002-00; C08F292-00

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 47, 57, 76

IT Filters
Primary **batteries**
(nanoscale carbon-contg. dispersions and their polymerizable compns., moldings, and manuf.)

IT **1306-38-3, Ceria,** uses **64417-98-7,**
Yttrium **zirconium oxide** 126447-16-3, Lanthanum strontium manganate ((La,Sr)MnO_3)
(substrate; nanoscale carbon-contg. dispersions and their polymerizable compns., moldings, and manuf.)

IT **1314-23-4, Zirconia,** uses
(yttria-stabilized, substrate; nanoscale carbon-contg. dispersions and their polymerizable compns., moldings, and manuf.)

138:257681 Solid state potentiometric gaseous oxide sensor. Wachsman, Eric D.; Azad, Abul Majeed (University of Florida, USA). PCT Int. Appl. WO 2003027658 A1 **20030403**, 58 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US31041 20020930. PRIORITY: US 2001-966240 20010928.

AB A solid state **electrochem. cell** for measuring the concn. of a component of a gas mixt. includes a 1st semiconductor electrode and a 2nd semiconductor electrode formed from 1st and 2nd semiconductor materials, resp. The materials are selected so as to undergo a change in resistivity upon contacting a gas component, such as CO or NO. An electrolyte is provided in contact with the 1st and 2nd semiconductor electrodes. A ref. cell can be included in contact with the electrolyte. Preferably, a voltage response of the 1st semiconductor electrode when exposed to the component is opposite in slope direction to that of the 2nd semiconductor electrode to produce a voltage response equal to the sum of the abs. values of the individual voltages generated. A combustion engine includes an emission sensor for measuring pollutants and a feedback and control system uses measured pollutant concns. to direct adjustment of engine combustion conditions.

IT **1306-38-3, Cerium oxide (CeO_2**
), uses **1314-23-4, Zirconium oxide** (
ZrO_2), uses
(ion-conducting electrolyte; solid state potentiometric gaseous oxide sensor for use in combustion engine feedback and control system)

RN 1306-38-3 HCA
CN Cerium oxide (CeO2) (8CI, 9CI) (CA INDEX NAME)

O=Ce=O

RN 1314-23-4 HCA
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)

O=Zr=O

IT **1314-23-4D, Zirconia,** yttria-stabilized
64417-98-7, Yttrium **zirconium oxide**
(solid state potentiometric gaseous oxide sensor for use in combustion engine feedback and control system)
RN 1314-23-4 HCA
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)

O=Zr=O

RN 64417-98-7 HCA
CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM G01N027-407
ICS F02D041-14
CC 51-12 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 59, 76, 79
IT Combustion engines
Control apparatus
Electrochemical cells
Exhaust gases (engine)
Ionic conductors
Semiconductor gas sensors
Solid electrolytes
(solid state potentiometric gaseous oxide sensor for use in combustion engine feedback and control system)
IT 1304-76-3, Bismuth oxide (Bi2O3), uses **1306-38-3, Cerium oxide (CeO2)**, uses
1314-23-4, Zirconium oxide (ZrO2
), uses
(ion-conducting electrolyte; solid state potentiometric gaseous oxide sensor for use in combustion engine feedback and control system)
IT **1314-23-4D, Zirconia,** yttria-stabilized
1314-36-9D, Yttria, **zirconia** stabilized by
64417-98-7, Yttrium **zirconium oxide**

(solid state potentiometric gaseous oxide sensor for use in combustion engine feedback and control system)

L57 ANSWER 6 OF 17 HCA

138:26872 Method for introduction of electrode active oxide into cathode of solid-state fuel cell. Chiba, Reiichi; Yoshimura, Bunichi; Sakurai, Yoji (Nippon Telegraph and Telephone Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002352808 A2 **20021206**, 19 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-161836 20010530.

AB The title fuel cell is manufd. by forming a porous cathode integrated with a dense solid electrolyte by sintering, impregnating an organometal soln. or inorg. metal soln. into the cathode, and then thermally decompg. for oxidn. to introduce an electrode active oxide providing **electron** cond. and **O** ion cond. at periphery of interface between the solid electrolyte. The active oxide may be represented as (1) Ln11-xA1xCo1-yB1yO3(Ln1 = La, Pr, Nd, Sm, Eu, and/or Gd; A1 = Sr and/or Ca; x = 0-0.8; B1 = Mn, Fe, Ni, Ga, Al, and/or Mg; y = 0-0.9), (2) Ln21-xA2xFe1-yB2yO3 (Ln2 = La, Pr, Nd, Sm, Eu, and/or Gd; A2 = Sr and/or Ca; x = 0-0.8; B2 = Mn, Ni, Co, Ga, Al, and/or Mg; y = 0.0-0.9), (3) Ln3zA3xMn1-yB3yO3 (Ln3 = La, Pr, Nd, Sm, Eu, and/or Gd; 0.999 - x .ltoreq. z .ltoreq. 0.95 - x; A3 = Sr, Ca, and/or Ba; x = 0.35-0.80; B3 = Co, Fe, Ni, Ga, Al, and/or Mg; y = 0.0-0.2), (4) Ce1-x-yA4xTiyO2 (A4 = La, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Yb, Lu, Y, and/or Sc; x = 0.10-0.4; y = 0-0.2), or (5) Bi1-xA5xO1.5 (A5 = rare earth metals and/or transition metals; x .ltoreq.0.3). The resulting fuel cell provides high performance.

IC ICM H01M004-88
ICS H01M004-86; H01M008-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST thermal decompn cathode active oxide solid **electrolyte** fuel **cell**

IT 1304-76-3P, Bismuth oxide (Bi2O3), uses 12016-86-3P, Cobalt lanthanum oxide (CoLaO3) 12526-47-5P, Cobalt praseodymium oxide (CoPrO3) 59989-75-2P, Cobalt gadolinium strontium oxide (Co2GdSrO6) 64296-91-9P, Lanthanum manganese strontium oxide (LaMn2SrO6) 106390-24-3P, Bismuth yttrium oxide (Bi1.8Y0.2O3) 106390-43-6P 107068-51-9P, Cobalt neodymium strontium oxide (CoNd0.6Sr0.4O3) 108822-67-9P, Cobalt iron lanthanum strontium oxide (Co0.4Fe0.6La0.6Sr0.4O3) 108916-09-2P, Cobalt lanthanum strontium oxide (CoLa0.8Sr0.2O3) 109118-13-0P, Cobalt lanthanum strontium oxide (CoLa0.2Sr0.8O3) 109546-91-0P, Iron lanthanum strontium oxide (FeLa0.8Sr0.2O3) 110601-67-7P, Cobalt lanthanum nickel oxide (Co0.3LaNi0.7O3) 110620-52-5P, Cobalt lanthanum strontium oxide (CoLa0.6Sr0.4O3) 110641-93-5P, Iron lanthanum nickel oxide (Fe0.3LaNi0.7O3) 110758-52-6P, Iron lanthanum strontium oxide (FeLa0.6Sr0.4O3) 115112-56-6P, Cobalt samarium strontium oxide (CoSm0.6Sr0.4O3) 115135-40-5P, Cobalt praseodymium

strontium oxide (CoPr0.6Sr0.4O3) 115135-46-1P, Cobalt lanthanum nickel strontium oxide (Co0.8La0.6Ni0.2Sr0.4O3) 115135-47-2P, Cobalt iron lanthanum strontium oxide (Co0.8Fe0.2La0.6Sr0.4O3) 116738-87-5P, Iron lanthanum strontium oxide (FeLa0.2Sr0.8O3) 117127-91-0P, Calcium cobalt lanthanum oxide (Ca0.2CoLa0.8O3) 117655-93-3P, Calcium cobalt lanthanum oxide (Ca0.4CoLa0.6O3) 129268-78-6P, Cobalt praseodymium strontium oxide (CoPr0.2Sr0.8O3) 130071-47-5P, Cerium praseodymium oxide (Ce0.8Pr0.2O2) 132325-87-2P, Calcium cobalt lanthanum oxide (Ca0.8CoLa0.2O3) 136574-80-6P, Calcium cobalt gadolinium oxide (Ca0.5CoGd0.5O3) 136854-58-5P, Cerium gadolinium oxide (Ce0.8Gd0.2O2) 144857-61-4P, Cobalt europium strontium oxide (CoEu0.5Sr0.5O3) 148595-66-8P, Cobalt iron lanthanum strontium oxide (Co0.2Fe0.8La0.6Sr0.4O3) 149319-01-7P, Cerium yttrium oxide (Ce0.8Y0.2O2) 156363-84-7P, Cerium lanthanum oxide (Ce0.8La0.2O2) 156363-85-8P, Cerium neodymium oxide (Ce0.8Nd0.2O2) 158307-84-7P, Iron lanthanum manganese strontium oxide (Fe0.8La0.6Mn0.2Sr0.4O3) 159423-44-6P, Cerium samarium oxide (Ce0.9Sm0.1O2) 162105-72-8P, Cerium samarium oxide (Ce0.8Sm0.2O2) 183134-75-0P, Cerium terbium oxide (Ce0.8Tb0.2O2) 184045-32-7P, Iron lanthanum nickel strontium oxide (Fe0.8La0.6Ni0.2Sr0.4O3) 209541-50-4P, Bismuth niobium oxide (Bi0.9Nb0.1O1.5) 210474-64-9P, Bismuth lanthanum oxide (Bi1.8La0.2O3) 220696-91-3P, Gallium lanthanum nickel oxide (Ga0.7LaNi0.3O3) 261732-88-1P, Calcium cobalt samarium oxide (Ca0.4CoSm0.6O3) 281194-49-8P, Cerium europium oxide (Ce0.8Eu0.2O2) 320413-44-3P 477849-88-0P, Cobalt strontium terbium oxide (CoSr0.5Tb0.5O3) 477849-89-1P, Calcium cobalt praseodymium oxide (Ca0.4CoPr0.6O3) 477849-90-4P, Calcium cobalt praseodymium oxide (Ca0.8CoPr0.2O3) 477849-91-5P, Calcium cobalt neodymium oxide (Ca0.4CoNd0.6O3) 477849-92-6P, Calcium cobalt europium oxide (Ca0.5CoEu0.5O3) 477849-93-7P, Calcium cobalt terbium oxide (Ca0.5CoTb0.5O3) 477849-94-8P, Cobalt lanthanum nickel strontium oxide (Co0.5La0.9Ni0.5Sr0.1O3) 477849-95-9P, Cobalt gallium lanthanum strontium oxide (Co0.7Ga0.3La0.6Sr0.4O3) 477849-97-1P, Cobalt gallium lanthanum strontium oxide (Co0.1Ga0.9La0.6Sr0.4O3) 477849-99-3P 477850-00-3P 477850-01-4P, Gallium lanthanum nickel strontium oxide (Ga0.7La0.9Ni0.3Sr0.1O3) 477850-02-5P 477850-03-6P 477850-04-7P 477850-05-8P 477850-06-9P, Gallium iron lanthanum strontium oxide (Ga0.3Fe0.7La0.6Sr0.4O3) 477850-07-0P, Gallium iron lanthanum strontium oxide (Ga0.9Fe0.1La0.6Sr0.4O3) 477850-08-1P, Aluminum iron lanthanum strontium oxide (Al0.15Fe0.85La0.6Sr0.4O3) 477850-09-2P, Aluminum iron lanthanum strontium oxide (Al0.9Fe0.1La0.6Sr0.4O3) 477850-10-5P 477850-11-6P 477850-12-7P 477850-13-8P 477850-14-9P, Lanthanum manganese strontium oxide (La0.64MnSr0.35O3) 477850-16-1P, Lanthanum manganese strontium oxide (La0.49MnSr0.5O3) 477850-18-3P, Lanthanum manganese strontium oxide (La0.19MnSr0.8O3)

477850-20-7P, Manganese praseodymium strontium oxide (MnPr0.84Sr0.15O3) 477850-22-9P, Manganese praseodymium strontium oxide (MnPr0.49Sr0.5O3) 477850-24-1P, Manganese neodymium strontium oxide (MnNd0.49Sr0.5O3) 477850-26-3P, Manganese samarium strontium oxide (MnSm0.49Sr0.5O3) 477850-28-5P, Europium manganese strontium oxide (Eu0.49MnSr0.5O3) 477850-30-9P, Gadolinium manganese strontium oxide (Gd0.49MnSr0.5O3) 477850-32-1P, Calcium lanthanum manganese oxide (Ca0.5La0.49MnO3) 477850-34-3P, Calcium gadolinium manganese oxide (Ca0.5Gd0.49MnO3) 477850-36-5P, Barium lanthanum manganese oxide (Ba0.5La0.49MnO3) 477850-38-7P, Barium gadolinium manganese oxide (Ba0.5Gd0.49MnO3) 477850-40-1P 477850-42-3P, Iron lanthanum manganese strontium oxide (Fe0.1La0.59Mn0.9Sr0.4O3) 477850-44-5P 477850-46-7P 477850-48-9P 477850-50-3P 477850-55-8P, Cerium samarium oxide (Ce0.6Sm0.4O2) 477850-63-8P, Cerium dysprosium oxide (Ce0.8Dy0.2O2) 477850-65-0P, Cerium holmium oxide (Ce0.8Ho0.2O2) 477850-67-2P, Cerium erbium oxide (Ce0.8Er0.2O2) 477850-69-4P, Cerium ytterbium oxide (Ce0.8Yb0.2O2) 477850-71-8P, Cerium lutetium oxide (Ce0.8Lu0.2O2) 477850-73-0P, Cerium scandium oxide (Ce0.8Sc0.2O2) 477850-75-2P, Cerium samarium yttrium oxide (Ce0.8Sm0.1Y0.1O2) 477850-77-4P, Cerium samarium titanium oxide (Ce0.7Sm0.1Ti0.2O2) 477850-79-6P, Cerium samarium titanium oxide (Ce0.6Sm0.2Ti0.2O2) 477850-81-0P, Cerium samarium titanium yttrium oxide (Ce0.6Sm0.1Ti0.2Y0.1O2) 477850-86-5P, Bismuth **cerium oxide** (Bi1.7Ce0.3O3) 477850-88-7P, Bismuth neodymium oxide (Bi1.7Nd0.3O3) 477850-90-1P, Bismuth lutetium oxide (Bi1.8Lu0.2O3) 477850-94-5P, Bismuth tantalum oxide (Bi1.8Ta0.2O3) 477850-96-7P, Bismuth tungsten oxide (Bi1.8W0.2O3) 477850-99-0P, Bismuth molybdenum oxide (Bi1.8Mo0.2O3) 477851-01-7P, Bismuth **zirconium oxide** (Bi1.8Zr0.2O3) 477851-12-0P, Gallium iron lanthanum strontium oxide (Ga0.2Fe0.8La0.6Sr0.4O3)
(introduction of electrode active oxide into cathode by thermal decompn. for solid-state fuel cell)

L57 ANSWER 7 OF 17 HCA COPYRIGHT 2006 ACS on STN

131:190965 Simultaneous determination of chemical diffusion and surface exchange coefficients of oxygen by the potential step technique. Diethelm, Stefan; Closset, Alexandre; Nisancioglu, Kemal; Van herle, Jan; McEvoy, A. J.; Gur, Turgut M. (Laboratoire de Photonique et Interfaces, Ecole Polytechnique Federale de Lausanne, Lausanne, CH 1015, Switz.). Journal of the Electrochemical Society, 146(7), 2606-2612 (English) **1999**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

AB Oxygen diffusion is treated in a dense electronically conducting cobaltate pellet blocked ionically on one surface, electronically on the other, and sealed on its cylindrical periphery. A procedure is developed for extg. the chem. diffusion and surface exchange coeffs. for oxygen by use of the asymptotic equations derived for the

current response to a potential step at short and long times. It is shown that, while the formation of interfacial phases by reaction between the sample and the electrolyte may affect the surface exchange coeff., the chem. diffusion coeff. data detd. by the present approach are independent of such interfacial phenomena. The consistency of data obtained from several specimens with varying thickness and manner of interfacing with the electrolyte validates the diffusion model and the method used for data anal. An oxygen permeation cell is also developed in this work as a modification of the diffusion cell. The new cell allows monitoring of the permeation rate by electrochem. means. The steady-state permeation data obtained by the permeation cell are consistent with the chem.-diffusion and surface-exchange coeffs. measured by the blocked diffusion cell as long as the assumptions of the related theor. models are satisfied. This is a further validation of the diffusion model and the related methodol. developed here for obtaining the necessary data for characterizing oxygen exchange and transport in such materials.

IT **64417-98-7**, Yttrium **zirconium oxide**
(chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

RN 64417-98-7 HCA

CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **1306-38-3**, **Ceria**, uses
(yttria and gadolinia doped; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

RN 1306-38-3 HCA

CN Cerium oxide (CeO2) (8CI, 9CI) (CA INDEX NAME)

O=Ce=O

IT **1314-23-4**, **Zirconium oxide** (**ZrO2**
), uses
(yttria stabilized; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)

O=Zr=O

CC 72-3 (Electrochemistry)
Section cross-reference(s): 65, 69

IT **Electrolytic cells**
(simultaneous detn. of chem. diffusion and surface exchange coeffs. of oxygen by potential step technique obtained in permeation cell)
IT **64417-98-7**, Yttrium **zirconium oxide**
(chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)
IT **1306-38-3**, **Ceria**, uses
(yttria and gadolinia doped; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)
IT **1314-23-4**, **Zirconium oxide** (**ZrO2**), uses
(yttria stabilized; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)
IT 1314-36-9, Yttrium oxide (Y2O3), uses
(**zirconia** stabilized by; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

L57 ANSWER 8 OF 17 HCA COPYRIGHT 2006 ACS on STN
131:50994 The role of the solid electrolyte support on the NEMCA behavior of ethylene oxidation on Pt. Makri, M.; Buekenhoudt, A.; Luyten, J.; Brosda, S.; Petrolekas, P.; Pliangos, C.; Bebelis, S.; Vayenas, C. G. (Department of Chemical Engineering, University of Patras, Patras, GR-26500, Greece). Institution of Chemical Engineers Symposium Series, 145(Electrochemical Engineering), 269-280 (English) **1999**. CODEN: ICESDB. ISSN: 0307-0492. Publisher: Institution of Chemical Engineers.
AB The effect of non-Faradaic electrochem. modification of catalytic activity (NEMCA) or electrochem. promotion (EP) has been investigated for the oxidn. of ethylene on Pt using several types of solid electrolytes and mixed conductors. The common features and differences are summarized and discussed together with the underlying electrochem. promotion mechanism on the basis of recent exptl. and theor. studies.
IT **64417-98-7**, Yttrium **zirconium oxide**
(ethylene electrooxidn. on Pt, in **electrolytic cell** with YSZ solid electrolyte support)
RN 64417-98-7 HCA
CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **1306-38-3**, **Cerium dioxide**, uses
(solid electrolyte support for ethylene electrooxidn. on Pt)
RN 1306-38-3 HCA
CN Cerium oxide (CeO2) (8CI, 9CI) (CA INDEX NAME)

O=Ce=O

IT **1314-23-4, Zirconium oxide (ZrO2**
), uses
(yttria stabilized; ethylene electrooxidn. on Pt, in
electrolytic cell with YSZ solid electrolyte
support)
RN 1314-23-4 HCA
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)

O=Zr=O

CC 72-2 (Electrochemistry)
Section cross-reference(s): 67
IT **64417-98-7**, Yttrium **zirconium oxide**
(ethylene electrooxidn. on Pt, in **electrolytic**
cell with YSZ solid electrolyte support)
IT 11138-49-1, Aluminum sodium oxide
(ethylene electrooxidn. on Pt, in **electrolytic**
cell with .beta.-Al2O3 solid electrolyte support)
IT **1306-38-3, Cerium dioxide**, uses
13463-67-7, Titanium dioxide, uses 58572-20-6, Sodium zirconium
phosphate silicate (Na3Zr2(PO4)(SiO4)2) 142107-79-7, Calcium
indium **zirconium oxide** CaIn0.1Zr0.9O3
(solid electrolyte support for ethylene electrooxidn. on Pt)
IT **1314-23-4, Zirconium oxide (ZrO2**
), uses
(yttria stabilized; ethylene electrooxidn. on Pt, in
electrolytic cell with YSZ solid electrolyte
support)
IT 1314-36-9, Yttrium oxide (Y2O3), uses
(**zirconia** stabilized by; ethylene electrooxidn. on Pt,
in **electrolytic cell** with YSZ solid
electrolyte support)

L57 ANSWER 9 OF 17 HCA COPYRIGHT 2006 ACS on STN
129:43242 Oxygen surface exchange of Y0.2Ce0.8O2-x under reducing
atmosphere. Horita, Teruhisa; Yamaji, Katsuhiko; Sakai, Natsuko;
Ishikawa, Masahiko; Yokokawa, Harumi; Kawada, Tatsuya; Dokiya,
Masayuki (National Institute of Materials and Chemical Research,
Tsukuba, 305, Japan). Electrochemical and Solid-State Letters,
1(1), 4-6 (English) **1998**. CODEN: ESLEF6. ISSN:
1099-0062. Publisher: Electrochemical Society.
AB Oxygen surface exchange was measured for Y0.2Ce0.8O2-x (YDC) and
Y0.15Zr0.85O2-y (YSZ) over a wide range of oxygen partial pressures

(7.3 .times. 10-21 to 0.17 bar) by isotope oxygen exchange (18O/16O) using secondary-ion mass spectrometry anal. at 973 K. Diffusion depth profiles of 18O in YDC and YSZ were analyzed by an appropriate fitting equation to calc. diffusion coeff. (D) and surface exchange coeff. (k). The diffusion coeffs. (D) for YDC and YSZ are consistent with the ref. data. The k values for both materials were similar (about k = 5-9 .times. 10-8 cm s-1) at the same temps. The k value increases with decreasing oxygen partial pressure for both YDC and YSZ. A relationship between the k value and the concns. of **electron** and **oxygen** vacancy is discussed.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell yttrium **cerium oxide**; oxygen surface exchange yttrium **cerium oxide**

IT Fuel **cell electrolytes**
Solid state fuel cells
(oxygen surface exchange of Y0.2Ce0.8O2-x under reducing atm.)

IT 7782-44-7, Oxygen, processes 149319-01-7D, Cerium yttrium oxide ce0.8y0.2o2, oxygen-deficient 177739-22-9D, Yttrium **zirconium oxide** Y0.15Zr0.85O2, oxygen-deficient
(oxygen surface exchange of Y0.2Ce0.8O2-x under reducing atm.)

L57 ANSWER 10 OF 17 HCA COPYRIGHT 2006 ACS on STN

129:22439 Intercalation compounds with lithium and oxygen guests. Bruce, Peter G.; Armstrong, A. Robert; Gitzendanner, Robert; Jennings, Richard; Thomson, James (School of Chemistry, University of St Andrews, St Andrews, KY16 9ST, UK). Proceedings - Electrochemical Society, 97-24(Ionic and Mixed Conducting Ceramics), 205-218 (English) **1998**. CODEN: PESODO. ISSN: 0161-6374. Publisher: Electrochemical Society.

AB The synthesis and intercalation chem. of layered LixMnO2 is presented. This material cannot be prepd. by conventional means, instead its synthesis involves the formation of the Na phase NaMnO2 followed by ion exchange. Extn. of Li involves conversion of the monoclinically distorted layered structure to the more regular rhombohedral structure at Li0.5MnO2. On fully deintercalating Li a new polymorph of MnO2 with a layered structure was obtained. On charge/discharge, capacity is lost during the 1st cycle. **O** was **intercalated** for the 1st time into a oxide with a pyrochlore structure, specifically Ce2Zr2O7. **O** **intercalation** is accompanied by displacement of some of the oxide ions to make more equitable coordination nos. round the Ce and Zr ions. It is possible to **intercalate O** up to the compn. of fluorite Ce2Zr2O8 while retaining the cation ordering of pyrochlore.

IT **12157-80-1P**, Cerium zirconium oxide (Ce2Zr2O7)
(prepn. and **oxygen intercalation** of)

RN 12157-80-1 HCA

CN Cerium zirconium oxide (Ce2Zr2O7) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **12157-80-1DP**, Cerium zirconium oxide (Ce2Zr2O7), oxygen-excess
(prepn. of)
RN 12157-80-1 HCA
CN Cerium zirconium oxide (Ce2Zr2O7) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
CC 78-3 (Inorganic Chemicals and Reactions)
Section cross-reference(s): **72**
ST lithium manganese oxide intercalation compd prepn; cerium zirconium oxide intercalation compd prepn; **intercalation** compd lithium **oxygen** guest prepn
IT **12157-80-1P**, Cerium zirconium oxide (Ce2Zr2O7)
(prepn. and **oxygen intercalation** of)
IT **12157-80-1DP**, Cerium zirconium oxide (Ce2Zr2O7), oxygen-excess
(prepn. of)

L57 ANSWER 11 OF 17 HCA
129:11943 Thermodynamic behavior of various phases appearing in the CeZrO4-CeZrO3.5 system and the formation of metastable solid solutions. Otsuka-Yao-Matsuo, Shinya; Izu, Noriya; Omata, Takahisa; Ikeda, Katsuhiko (Department of Materials Science and Processing, Graduate School of Engineering, Osaka University, Suita, 565-0871, Japan). Journal of the Electrochemical Society, 145(4), 1406-1413 (English) **1998**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.
AB To study the thermodn. behavior of t', t*, and .kappa. phases CeZrO4, the equil. O partial pressure, pO2, over their mixts. with pyrochlore (Ce2Zr2O7+x) was measured using an **electrochem. cell**: Pt, {CeZrO4(t', t*, or .kappa. phase) + Ce2Zr2O7+x}/ZrO2(+Y2O3)/air, Pt. The conclusions described below were derived: the thermodn. stability of the .kappa. phase is the lowest in the CeO2-ZrO2 system. The .kappa. phase forms metastable solid solns. with the pyrochlore phase; it was virtually stable around 1123 K. Two kinds of tetragonal phases exist, tet. (high temp.) and tet. (low temp.), which may correspond to t' and t*, resp. A change in pO2 corresponding to the phase transitions: .kappa. .fwdarw. t' and t' .dblarw. t* was obsd. The std. Gibbs energies of formation, .DELTA.G.degree., of .kappa.(CeZrO4) and t*(CeZrO4) for the reaction: 0.5Ce2Zr2O7 + 1/4O2 .fwdarw. CeZrO4 were evaluated from the emf. data.
IT **207459-97-0P**, Cerium zirconium oxide (Ce2Zr2O7.67)
207459-99-2P, Cerium zirconium oxide (Ce2Zr2O7.53)
207460-03-5P, Cerium zirconium oxide (Ce2Zr2O7.05)
(formation and crystal structure)
RN 207459-97-0 HCA
CN Cerium zirconium oxide (Ce2Zr2O7.67) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	7.67	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

RN 207459-99-2 HCA
CN Cerium zirconium oxide ($Ce2Zr2O7.53$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	7.53	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

RN 207460-03-5 HCA
CN Cerium zirconium oxide ($Ce2Zr2O7.05$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	7.05	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

IT **12157-80-1P**, Cerium zirconium oxide (Ce2Zr2O7)
(reaction with oxygen)
RN 12157-80-1 HCA
CN Cerium zirconium oxide (Ce2Zr2O7) (8CI, 9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **53169-24-7**, Cerium zirconium oxide (CeZrO4)
(thermodn. behavior of various phases appearing in
CeZrO4-CeZrO3.5 system and formation of metastable solid solns.)
RN 53169-24-7 HCA
CN Cerium zirconium oxide (CeZrO4) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

CC 78-2 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 69, 75

IT **207459-97-0P**, Cerium zirconium oxide (Ce2Zr2O7.67)
207459-99-2P, Cerium zirconium oxide (Ce2Zr2O7.53)
207460-03-5P, Cerium zirconium oxide (Ce2Zr2O7.05)
(formation and crystal structure)
IT **12157-80-1P**, Cerium zirconium oxide (Ce2Zr2O7)
(reaction with oxygen)
IT **53169-24-7**, Cerium zirconium oxide (CeZrO4)
(thermodn. behavior of various phases appearing in CeZrO4-CeZrO3.5 system and formation of metastable solid solns.)

L57 ANSWER 12 OF 17 HCA COPYRIGHT 2006 ACS on STN
126:283965 Nitric oxide reduction using platinum electrodes on yttria-stabilized **zirconia**. Walsh, Kenneth J.; Fedkiw, Peter S. (Department of Chemical Engineering, North Carolina State University, Raleigh, USA). Solid State Ionics, 93(1,2), 17-31 (English) **1996**. CODEN: SSIOD3. ISSN: 0167-2738. Publisher: Elsevier.
AB Porous platinum and platinum/**ceria** electrodes deposited on yttria-stabilized **zirconia** (YSZ) were used to reduce electrochem. nitric oxide in inert gases at 500-600.degree.. A cyclic voltammetric study indicates that nitric oxide redn. occurs more rapidly on an electrode thermodynamically predicted to exist as reduced platinum and not as platinum dioxide. The steady-state nitric oxide decompn. rate increases with temp., NO concn., and cathodic polarization. Nitric oxide is also reduced on the platinum-based electrodes in streams contg. both nitric oxide and oxygen. The currents at a given electrode potential and temp. are more than an order of magnitude higher in the NO/O2 streams than in the NO/inert gases due to simultaneous oxygen redn. The yield factors, defined as the relative rate of NO redn. compared to O2 redn. (cor. for species concns.), are 0.2-0.6 for both electrodes. The yield factors are insensitive to **ceria** addn., oxygen concn., applied current, and temp. in the ranges studied.
IT **1306-38-3**, **Ceria**, uses
(nitric oxide redn. using platinum and platinum/**ceria** electrodes deposited on yttria-stabilized **zirconia**)
RN 1306-38-3 HCA
CN Cerium oxide (CeO2) (8CI, 9CI) (CA INDEX NAME)

IT **64417-98-7**, Yttrium **zirconium oxide**
(nitric oxide redn. using platinum electrodes on yttria-stabilized **zirconia**)
RN 64417-98-7 HCA
CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT 1314-23-4, **Zirconia**, uses
(yttria-stabilized; nitric oxide redn. using platinum electrodes on)
RN 1314-23-4 HCA
CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)

O═Zr═O

CC 72-2 (Electrochemistry)
Section cross-reference(s): 67
IT Reduction, electrochemical
(of nitric oxide using platinum electrodes on yttria-stabilized **zirconia**)
IT **Electrochemical cells**
(yttria-stabilized **zirconia** cell for redn. of NO)
IT **1306-38-3, Ceria**, uses
(nitric oxide redn. using platinum and platinum/**ceria** electrodes deposited on yttria-stabilized **zirconia**)
IT 7440-06-4, Platinum, uses **64417-98-7**, Yttrium **zirconium oxide** 114168-16-0, Yttrium **zirconium oxide** y0.16zr0.92o2.08
(nitric oxide redn. using platinum electrodes on yttria-stabilized **zirconia**)
IT 10102-43-9, Nitric oxide, properties
(nitric oxide redn. using platinum electrodes on yttria-stabilized **zirconia**)
IT 7782-44-7, Oxygen, properties
(nitric oxide redn. with and without oxygen using platinum and platinum/**ceria** electrodes deposited on yttria-stabilized **zirconia**)
IT **1314-23-4, Zirconia**, uses
(yttria-stabilized; nitric oxide redn. using platinum electrodes on)
IT 1314-36-9, Yttria, uses
(**zirconia** stabilized by; nitric oxide redn. using platinum electrodes on)

L57 ANSWER 13 OF 17 HCA COPYRIGHT 2006 ACS on STN
124:207233 Anodes for solid-**electrolyte** fuel **cells**.
Nakanishi, Naoya; Kadowaki, Shoten; Kawamura, Hiroyuki; Taniguchi, Shunsuke; Yasuo, Koji; Akyama, Yukinori; Myake, Yasuo; Saito, Toshihiko (Sanyo Electric Co, Japan). Jpn. Kokai Tokkyo Koho JP 07326364 A2 **19951212** Heisei, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-119900 19940601.
AB The anodes comprise surface modified ceramics contg. ceramic particles coated with conductors having **O** ion and **electron** cond. and metals. The conductors may be Ce-based

oxides, e.g., (**CeO2**)0.8(Sm2O3)0.2 , (**CeO2**
)0.8(Y2O3)0.2, (**CeO2**)0.8(La2O3)0.2 or Pr oxides, e.g.,
PrOx (0 <x .ltoreq.3). Fuel cells using these anodes have high
voltage and long life.

IC ICM H01M004-86
ICS C04B035-50; H01M004-88; H01M008-02; H01M008-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57

ST **ceria** conductor ceramic metal anode; praseodymium oxide
ceramic metal anode; solid **electrolyte** fuel **cell**
anode

IT 64417-98-7, Yttrium **zirconium oxide**
(fuel-cell anodes from surface-modified)

L57 ANSWER 14 OF 17 HCA COPYRIGHT 2006 ACS on STN

110:138525 Electrocatalytic conversion of light hydrocarbons to
synthesis gas. Mazanec, Terry J.; Cable, Thomas L.; Frye, John G.,
Jr. (Standard Oil Co., USA). U.S. US 4793904 A **19881227**,
6 pp. (English). CODEN: USXXAM. APPLICATION: US 1987-105120
19871005.

AB Synthesis gas is produced from light hydrocarbons such as CH4 or
natural gas by: providing an **electrochem. cell**
comprising a solid electrolyte having a 1st surface coated with
conductive metal, metal oxide, or their mixts. capable of
facilitating the redn. of O to O ions; and 2nd surface coated with
conductive metal, metal oxide, or their mixts., provided that both
coatings are stable at the operating temps.; heating the cell to
.gtoreq.1000 .degree.; passing an O-contg. gas in contact with the
1st conductive coating; passing CH4, natural gas, or other light
hydrocarbons in contact with the 2nd conductive coating; and
recovering synthesis gas. The 2 coatings are connected to an
external circuit to generate electricity during the conversion of
the hydrocarbon. The solid electrolyte is preferably Y2O3- or
CaO-stabilized ZrO2; the 1st coating can be Ni, Au, Pt, Pd, Cu,
La-Mg-Sr, ITO, or their mixts.; and the 2nd coating can be Ni, Au,
Pt, Pd, Cu, their mixts., Ce oxide-La oxide, or Ce oxide-ZrO2. The
recovered gas comprises CO, H, and at least some C2H2. A cell
having a 1st Pt coating and a 2nd CeZrO4 coating operated at
1100.degree. had 49.2% conversion of CH4 with a selectivity (moles
of C in product/mol of CH4 converted) of CO 90.9, CO2 8.2, and C2
material 0.9%.

IT **53169-24-7**, Cerium zirconium oxide (CeZrO4)
(electrodes, in **galvanic cells** for
electrocatalytic conversion of hydrocarbons in synthesis gas
manuf.)

RN 53169-24-7 HCA

CN Cerium zirconium oxide (CeZrO4) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

IC ICM C25B003-00
INCL 204-59R
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 52, 72
IT 1312-81-8, Lanthanum oxide (La2O3)
(electrodes contg. ceria and, in **galvanic cell** for electrocatalytic conversion of hydrocarbons in synthesis gas manuf.)
IT 11129-18-3, Cerium oxide (unspecified)
(electrodes contg. lanthanum oxide and, in **galvanic cells** for electrocatalytic conversion of hydrocarbons in synthesis gas manuf.)
IT 7440-02-0, Nickel, uses and miscellaneous 7440-05-3, Palladium, uses and miscellaneous 7440-06-4, Platinum, uses and miscellaneous 7440-50-8, Copper, uses and miscellaneous 7440-57-5, Gold, uses and miscellaneous 50926-11-9, ITO **53169-24-7**, Cerium zirconium oxide (CeZrO4) 119763-58-5, Lanthanum, magnesium, strontium
(electrodes, in **galvanic cells** for electrocatalytic conversion of hydrocarbons in synthesis gas manuf.)

L57 ANSWER 15 OF 17 HCA COPYRIGHT 2006 ACS on STN
102:53035 Development and operation of thin-layer cells for high-temperature electrolysis. Dietrich, G.; Hermeking, H.; Koch, A.; Mueller, W. J. C.; Schaefer, W. (Dornier Syst. G.m.b.H., Friedrichshafen, D-7990, Fed. Rep. Ger.). Comm. Eur. Communities, [Rep.] EUR, EUR 9079, 96 pp. (German) **1984**. CODEN: CECED9.
AB An attempt was made to produce loss-free high-temp. **electrolytic** (HTE) **cells** (for producing H2 from H2O vapor) by using thin layers of solid electrolytes. The redn. of elec. losses or an increased c.d. at the same losses is the result of decreasing the electrolyte resistance by using these thin-layer cells. The cells were in the form of hollow cylinders. A simple method of gas transport and the elec. series connection of individual cells was possible. The Y-stabilized ZrO2 **electrolyte** for these **cells** was produced by using the electrochem. vapor deposition process. This process, originally used for coating disk-like HTE cells, was modified and further improved. The modified process allowed one to produce Y-stabilized

ZrO2 electrolyte with a thickness of 30 .mu.m with excellent reproducibility. A schematic representation of the completed cell is shown. The cathodes are made of Ni-cermet (Ni, Ce oxide, ZrO2) or Pt and the anodes of Ca-doped LaMnO3 or Pt. The std. conditions were a gas flow of 50 N-cm3/min H2 + 100 N-cm3/min H2O in the cathode chamber and a temp. of 1000.degree..

IT **94270-06-1**
(cathodes, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

RN 94270-06-1 HCA

CN Nickel alloy, base, Ni,CeO2,ZrO2 (9CI) (CA INDEX NAME)

Component	Component Registry Number
Ni	7440-02-0
CeO2	1306-38-3
ZrO2	1314-23-4

CC **72-9** (Electrochemistry)

ST thin layer zirconium dioxide electrolyte; yttrium stabilized zirconia solid electrolyte; hydrogen manuf electrolysis water vapor; **cell electrolytic** zirconia thin film

IT **Electrolytic cells**
(high-temp., with thin layers of solid electrolytes, for hydrogen manuf. from water vapor)

IT 12031-12-8
(anodes from calcium-doped, in high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 7440-70-2, uses and miscellaneous
(anodes from lanthanum manganese oxide doped with, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 7440-06-4, uses and miscellaneous
(cathodes, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT **94270-06-1**
(cathodes, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 7732-18-5, vapor
(electrolysis of, for hydrogen manuf., high-temp. **electrolytic cell** with thin layers of solid electrolyte for)

IT 1305-78-8, uses and miscellaneous
(electrolytes from zirconium dioxide stabilized with, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 1333-74-0P, preparation

(prodn. of, by electrolysis of water vapor, high-temp. **electrolytic cells** with thin layers of solid electrolytes for)

IT 1314-23-4, uses and miscellaneous
(solid electrolytes from yttrium-stabilized, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 1314-36-9, uses and miscellaneous 7440-65-5, uses and miscellaneous
(solid electrolytes from zirconium dioxide stabilized with, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

L57 ANSWER 16 OF 17 HCA COPYRIGHT 2006 ACS on STN

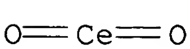
74:60131 Solid solutions of **ceria** as an anode material for solid **electrolyte** fuel **cells**. Takahashi, Takehiko; Iwahara, Hiroyasu; Ito, Isao (Fac. Eng., Nagoya Univ., Nagoya, Japan). Denki Kagaku, 38(7), 509-13 (Japanese) **1970**. CODEN: DNKKA2. ISSN: 0366-9440.

AB The powder of solid solns. of **ceria**, (**CeO2**)0.6(LaO1.5)0.4 or (**CeO2**)0.6(YO1.5)0.4, mixed with turpentine oil was painted onto a disk of stabilized **zirconia**, (**ZrO2**)0.85(CaO)0.15 or (**ZrO2**)0.82(YO1.5)0.18, while simultaneously embedding a Pt net or a small piece of Pt foil as an electronic conductor (collector). This assembly was baked at 1200.degree. for 3 hr. Polarization characteristics of the **ceria** acting as the anode, with **zirconia** as the solid electrolyte, were investigated at 1000.degree. in H fuel gas. The polarization obsd. was much lower and more stable than that obsd. with a Pt anode without **ceria**. The strong depolarization effect is due to a mixed conduction (**oxygen** ion and **electron**) in the solid soln. of **ceria**, presumably caused by a partial redn. of **ceria** by H. In this case, the anodic reaction would occur at the 2-phase boundary of the mixed conductor (**ceria**) and the fuel gas, rather than the 3-phase boundary of electrolyte, collector, and the fuel gas.

IT **1306-38-3**
(anodes, fuel-cell, coated on **zirconium oxide** with platinum collector)

RN 1306-38-3 HCA

CN Cerium oxide (CeO2) (8CI, 9CI) (CA INDEX NAME)



IT **1314-23-4**, uses and miscellaneous
(**electrolyte**, fuel-**cell**, with platinum as

electric conductor)
RN 1314-23-4 HCA
CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)

O═Zr═O

CC 77 (Electrochemistry)
ST **ceria** solid solns anodes; anodes **ceria** solid solns; solid solns **ceria** anodes; fuel **cells** solid **electrolytes; zirconia** solid electrolytes
IT Fuel cells
(anodes, **cerium oxide**, on stabilized **zirconium oxide** with platinum collector)
IT Anodes
(fuel-cell, stabilized **cerium oxide** coated on **zirconium oxide** electrolyte with platinum collector)
IT **1306-38-3**
(anodes, fuel-cell, coated on **zirconium oxide** with platinum collector)
IT **1314-23-4**, uses and miscellaneous
(**electrolyte**, fuel-**cell**, with platinum as electric conductor)

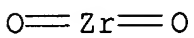
L57 ANSWER 17 OF 17 HCA COPYRIGHT 2006 ACS on STN
71:87173 Electrode for solid **electrolyte** fuel **cell.**
Tannenberger, Helmut (Compagnie Francaise de Raffinage). S. African ZA 6804674 **19681217**, 14 pp. (English). CODEN: SFXXAB. PRIORITY: CH 19670719.
AB Triple-layer porous electrodes are formed for the fuel cell operating at high temp. The cell element is comprised essentially of a thin (100 .mu.) electrolyte layer of mixed oxides of compn. **ZrO_2** 90 and Yb_2O_3 10 mole % and 2 composite porous electrodes. These electrodes each have facing towards the solid electrolyte a rigidly connected layer of 20-.mu. thickness formed of a single layer of approx. spherical-shaped granules of mixed oxides of **ZrO_2**-Yb_2O_3-UO_2 (molar proportion 82:10:8, resp.). The electrode has a 2nd porous layer of Ni (for the anode) and Ag (for the cathode) behind the 1st layer such that each of the granules of the 1st layer being in part covered, on its inside face, by an intermediate layer consisting of the same metal as the corresponding 2nd layer, to assure contact between the 1st and 2nd layers, and thus achieve good cond. without sacrificing porosity. Such a cell element yielded a c.d. of 1.0 amp./cm.2 under a voltage of 0.5 v. by operating the cell at 800.degree., using air and as fuel, a mixt. of H and CO. The 1st layer of granules of ceramic material which conducts **O** ions and **electrons** can also be formed

from a stabilized **ZrO_2** contg. CaO, MgO, Sc_2O_3, or rare earth oxides. Similarly UO_2 in the ternary mixt. can be replaced with **CeO_2** or a mixt. thereof. Other materials such as Ni oxides contg. Li oxide, or mixed oxides of Sr, La, and Co can also be used, instead of Ni and Ag.

IT **1314-23-4**, uses and miscellaneous
(in fuel **cells**, solid **electrolytes** from stabilized)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)



CC 77 (Electrochemistry)

ST solid oxide electrolyte; **electrolytes** fuel **cells** ; fuel **cells electrolytes**; oxides fuel **cells electrolytes**

IT **1314-23-4**, uses and miscellaneous
(in fuel **cells**, solid **electrolytes** from stabilized)

=> d l58 1-62 ti

L58 ANSWER 1 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Catalyst for hydrocarbon partial oxidation, and production method of hydrogen-containing gas

L58 ANSWER 2 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Composite oxygen ion transport element

L58 ANSWER 3 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Membrane-electrode assembly for polymer **electrolyte** fuel **cell**

L58 ANSWER 4 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Fuel-cell unit cell containing interlayer between solid electrolyte and interconnector and its cell stack

L58 ANSWER 5 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Method for manufacturing of fuel cells

L58 ANSWER 6 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Device for waste gas purification utilizing redox reaction

L58 ANSWER 7 OF 62 HCA COPYRIGHT 2006 ACS on STN

TI Fuel reforming apparatus for generating hydrogen-rich reforming gas from hydrocarbon

L58 ANSWER 8 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Catalytic membrane reactor with oxygen transport membrane

L58 ANSWER 9 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Hydrogen separation using **oxygen** ion-**electron** mixed conducting membranes

L58 ANSWER 10 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI The effect of oxide dopants in ceria on n-butane oxidation

L58 ANSWER 11 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Production of conductive metal oxide mixture

L58 ANSWER 12 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Reduction of greenhouse gas emissions by catalytic processes

L58 ANSWER 13 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Spectroscopic Characterization of Heterogeneity and Redox Effects in Zirconium-Cerium (1:1) Mixed Oxides Prepared by Microemulsion Methods

L58 ANSWER 14 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Supported Zr(Sc)O2 SOFCs for reduced temperature prepared by slurry coating and co-firing

L58 ANSWER 15 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Oxygen separation process with solid state membranes

L58 ANSWER 16 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Hydrogen generation by ammonia cracking with iron metal-rare earth oxide composite catalyst

L58 ANSWER 17 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Structural characterization and mixed conductivity of TiO2-doped ceria stabilized tetragonal zirconia

L58 ANSWER 18 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Physical characteristics and sintering behavior of ultrafine zirconia-ceria powders

L58 ANSWER 19 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Filters contg. pollutant-purification catalysts, air purification apparatus and other commodities employing the filters or catalysts

L58 ANSWER 20 OF 62 HCA COPYRIGHT 2006 ACS on STN

TI Electrophoretic forming of functionally graded ceramics

L58 ANSWER 21 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Pt/Ceria WGS catalysts for PEM fuel cell systems

L58 ANSWER 22 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Precursor slurry for solid electrolyte membranes and the electrolyte membranes

L58 ANSWER 23 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Multi-phase solid ion and electron conducting membrane with low volume percentage electron conducting phase and methods for fabricating

L58 ANSWER 24 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Mixed reactant fuel cells with flow through porous electrodes

L58 ANSWER 25 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Characterization of Ce1-xZrxO2 thin films prepared by pyrolytic spray technique

L58 ANSWER 26 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Preparation of Yttria-stabilized t'-phase zirconia for high temperature heating element applications

L58 ANSWER 27 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Ceria-zirconia-supported platinum catalyst for hydrocarbons combustion: low-temperature activity, deactivation and regeneration

L58 ANSWER 28 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Oxygen ion conductive solid state ceramic membranes for catalytic membrane reactors

L58 ANSWER 29 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Optically passive cerium containing counter-electrodes for electrochromic devices

L58 ANSWER 30 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Optical and electrochemical properties of Li+ intercalated Zr-Ce oxide and Hf-Ce oxide films

L58 ANSWER 31 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Invited paper: phase diagram implications for solid oxide fuel cells

L58 ANSWER 32 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Mixed cerium/titanium and cerium/zirconium oxides as thin-film counter electrodes for solid-state electrochromic transmissive devices

L58 ANSWER 33 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Optical and electrochemical properties of cerium-zirconium mixed oxide thin films deposited by sol-gel and r.f. sputtering

L58 ANSWER 34 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Synthesis of zirconia-based solid electrolyte powders by the coprecipitation technique

L58 ANSWER 35 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Electrochromism in oxide films based on lanthanides

L58 ANSWER 36 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Zr-Ce oxides as candidates for optically passive counterelectrodes

L58 ANSWER 37 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Electron emitter

L58 ANSWER 38 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Novel conducting thin film ceramic membranes for intermediate temperature fuel cells

L58 ANSWER 39 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Low-temperature preparation of nanocrystalline and dispersible metal oxide gels, and the products obtained

L58 ANSWER 40 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Coated membranes

L58 ANSWER 41 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Optical and electrochemical properties of Li+ intercalated Zr-Ce oxide and Hf-Ce oxide films

L58 ANSWER 42 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI **Oxygen** anion- and **electron**-mediating brownmillerite-type, gas-impermeable solid-state membranes, catalytic reactors containing the membranes, process for oxidizing a reactant gas capable of reacting with oxygen, and process for separating oxygen from an oxygen-containing gas

L58 ANSWER 43 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Fuel anodes for high-temperature solid-**electrolyte** fuel **cells**

L58 ANSWER 44 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Device for determination of solubility of metal oxide in melted salts

L58 ANSWER 45 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Polarization behavior of nickel-based electrocomposites

L58 ANSWER 46 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Impurity charge states and band-gap shift in **ZrO_2**-Y_2O_3:Co or Ce crystals before and after heat treatment

L58 ANSWER 47 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Electrolytic protection to reduce high-temperature oxidation

L58 ANSWER 48 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Stabilized zirconia solid electrolytes and their manufacture

L58 ANSWER 49 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Electrical properties of zirconia-ceria system

L58 ANSWER 50 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Stabilized zirconia solid electrolyte and its manufacture

L58 ANSWER 51 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Influence of dopant concentration on the electronic conductivity of nonstoichiometric yttria-doped **ceria**

L58 ANSWER 52 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Design and performance of high temperature ceramic electrode modules

L58 ANSWER 53 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Studies of zirconia-ceria base ceramic for MHD channel electrodes

L58 ANSWER 54 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Investigation of the partial charge of oxygen in different types of oxides using an x-ray photoelectron spectroscopic (ESCA) method

L58 ANSWER 55 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Measurement of the oxygen ion transport number in **oxygen** ion-**electron** mixed conductors

L58 ANSWER 56 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Electrode and insulation materials in magnetohydrodynamic generators

L58 ANSWER 57 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Nature and consequences of current blackening in stabilized **zirconia**

L58 ANSWER 58 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Electron and ion conductivity of the model system (0.75 **CeO_2** -0.25 **ZrO_2**)

L58 ANSWER 59 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Energies of formation of defects in the lattices of some oxides with fluorite-type structure

L58 ANSWER 60 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Methods of investigating the nature of conductivity of solid oxides

L58 ANSWER 61 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Production, general properties, and gas absorption of oxide films produced by electron-beam evaporation

L58 ANSWER 62 OF 62 HCA COPYRIGHT 2006 ACS on STN
TI Effects of the evaporation products of thermocathode substances, especially barium, on the transformation occurring in metallic oxides during their electronic bombardment

=> d l58 9,11,25,29,32,33,34,36,41,48,49,50,53,55 cbib abs hitstr hitind

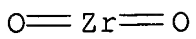
L58 ANSWER 9 OF 62 HCA COPYRIGHT 2006 ACS on STN
139:339909 Hydrogen separation using **oxygen** ion-**electron** mixed conducting membranes. Gopalan, Srikanth (Trustees of Boston University, USA). PCT Int. Appl. WO 2003089117 A1 **20031030**, 25 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-US11166 20030415. PRIORITY: US 2002-PV373531 20020418.

AB Hydrogen is sepd. from a stream of synthesis gas or other reformate gases at approx. 800-1000.degree., using a cell in which a mixt. of reformate gas and steam are passed on one side of a dense solid state ceramic membrane, while steam is passed on the other side. High purity hydrogen is generated on the steam side. The membrane is similar to one that has in the past been used for oxygen purifn. and can be single or two phase, for example La0.9Sr0.1Ga0.8Mg0.2O3 + Pd.

IT **1314-23-4**, **Zirconia**, uses
(doped; hydrogen sepn. using **oxygen** ion-**electron** mixed conducting membranes)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



IT **1306-38-3, Cerium oxide** (**CeO2**
), uses
(hydrogen sepn. using **oxygen** ion-**electron**
mixed conducting membranes)
RN 1306-38-3 HCA
CN Cerium oxide (CeO2) (8CI, 9CI) (CA INDEX NAME)

IC ICM B01D053-22
ICS B01D071-02
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 49
IT Transition metal oxides
(dopant; hydrogen sepn. using **oxygen** ion-
electron mixed conducting membranes)
IT Ceramic membranes
Fuel gas manufacturing
Steam reforming
Synthesis gas
(hydrogen sepn. using **oxygen** ion-**electron**
mixed conducting membranes)
IT Hydrocarbons, processes
(hydrogen sepn. using **oxygen** ion-**electron**
mixed conducting membranes)
IT 1308-38-9, Chromium oxide (Cr2O3), uses 1313-13-9, Manganese oxide
(MnO2), uses 1345-25-1, Ferrous oxide, uses 7440-24-6,
Strontium, uses 13463-67-7, Titanium dioxide, uses
(dopant; hydrogen sepn. using **oxygen** ion-
electron mixed conducting membranes)
IT **1314-23-4, Zirconia**, uses
(doped; hydrogen sepn. using **oxygen** ion-
electron mixed conducting membranes)
IT 74-98-6, Propane, processes 106-97-8, Butane, processes
111-65-9, Octane, processes 630-08-0, Carbon monoxide, processes
(hydrogen sepn. using **oxygen** ion-**electron**
mixed conducting membranes)
IT 1314-37-0, Ytterbium oxide 7440-02-0, Nickel, uses 7440-05-3,
Palladium, uses 7440-06-4, Platinum, uses 7440-22-4, Silver,
uses 7440-57-5, Gold, uses 12060-08-1, Scandium oxide
12064-62-9, Gadolinium oxide
(hydrogen sepn. using **oxygen** ion-**electron**
mixed conducting membranes)
IT 1333-74-0P, Hydrogen, preparation

(hydrogen sepn. using **oxygen** ion-**electron** mixed conducting membranes)

IT 74-82-8, Methane, reactions
(hydrogen sepn. using **oxygen** ion-**electron** mixed conducting membranes)

IT **1306-38-3, Cerium oxide (CeO2**
), uses 7440-37-1, Argon, uses 7440-59-7, Helium, uses
7727-37-9, Nitrogen, uses 155343-26-3
(hydrogen sepn. using **oxygen** ion-**electron** mixed conducting membranes)

IT 64886-84-6, Cobalt iron Lanthanum oxide
(strontium-doped; hydrogen sepn. using **oxygen** ion-**electron** mixed conducting membranes)

IT 1314-36-9, Yttria, uses
(**zirconia** stabilized by; hydrogen sepn. using **oxygen** ion-**electron** mixed conducting membranes)

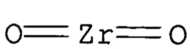
L58 ANSWER 11 OF 62 HCA COPYRIGHT 2006 ACS on STN
139:309501 Production of conductive metal oxide mixture. Sumita, Tatsuo; Kobayashi, Kiyoshi (National Institute of Advanced Industrial Science and Technology, Japan). Jpn. Kokai Tokkyo Koho JP 2003286010 A2 **20031007**, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-88252 20020327.

AB The mixt. consists of oxygen ion conductive metal oxides and elec. conductive metal oxides having thermodynamical equil. among the oxides. The method produces various types of oxide mixt. having oxygen ion and elec. conductivities by controlling the combination and the compn. ratio of starting metal oxides. The products have excellent sintering, molding, processable characteristics, and are suitable for O2 permeable and O2 enrichment materials.

IT **1306-38-3, Cerium Oxide**, uses
1314-23-4, Zirconium Oxide, uses
(prodn. of conductive metal oxide mixt.)

RN 1306-38-3 HCA
CN Cerium oxide (CeO2) (8CI, 9CI) (CA INDEX NAME)

RN 1314-23-4 HCA
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B013-18
ICS C01B013-02; C01G003-00; C01G009-00; C04B035-50; H01B001-08
CC 49-3 (Industrial Inorganic Chemicals)

ST metal oxide mixt **oxygen** ion **electron** cond
IT 64-17-5, Ethanol, uses **1306-38-3, Cerium Oxide**, uses 1308-87-8, Dysprosium Oxide 1308-96-9, Europium Oxide 1312-43-2, Indium Oxide 1313-97-9, Neodymium Oxide 1313-99-1, Nickel Oxide, uses 1314-13-2, Zinc Oxide, uses **1314-23-4, Zirconium Oxide**, uses 1314-36-9, Yttrium Oxide, uses 1314-37-0, Ytterbium Oxide 1317-34-6, Manganese Oxide (Mn2O3) 1317-38-0, Copper Oxide, uses 9002-89-5, Polyvinyl alcohol 12024-21-4, Gallium Oxide 12055-62-8, Holmium Oxide 12060-58-1, Samarium Oxide 37275-76-6, Aluminum zinc oxide 51184-16-8, Cerium yttrium oxide 55575-05-8, Cerium neodymium oxide 124386-52-3, Cerium copper neodymium oxide
(prodn. of conductive metal oxide mixt.)

L58 ANSWER 25 OF 62 HCA COPYRIGHT 2006 ACS on STN
135:159202 Characterization of Ce1-xZrxO2 thin films prepared by pyrolytic spray technique. Elidrissi, B.; Addou, M.; Regragui, M.; Mzerd, A.; Bougrine, A.; Kachouane, A. (Faculte des Sciences, Departement de Physique, Laboratoire d'Opto-Electronique et de Physico-Chimie des Materiaux, Kenitra, Morocco). Solid State Ionics, 140(3,4), 369-374 (English) **2001**. CODEN: SSIOD3. ISSN: 0167-2738. Publisher: Elsevier Science B.V..
AB It was demonstrated that spray pyrolysis can be used to prep. Ce1-xZrxO2 thin films with x between 0 and 1. The compn. of these films was detd. by electron probe microanal. (EPMA), and the cryst. structure by X-ray diffraction (XRD) and Raman spectroscopy (RS). Cyclic voltammetry (CV) was performed in an electrolyte of propylene carbonate with 1 M LiClO4. Films with high Zr content were incapable of charge exchange of Li+ ions. In the contrast, films with high Ce content were found to be able to insert/ext. large charge densities of Li+ ions. They also remained transparent during Li+ intercalation.
IT **135495-52-2P**, Cerium zirconium oxide ((Ce,Zr)O2)
213667-74-4P, Cerium zirconium oxide Ce0.81Zr0.19O2
352711-60-5P, Cerium zirconium oxide (Ce0.54Zr0.46O2)
352711-61-6P, Cerium zirconium oxide (Ce0.23Zr0.77O2)
(characterization of Ce1-xZrxO2 thin films prepd. by pyrolytic spray technique)
RN 135495-52-2 HCA
CN Cerium zirconium oxide ((Ce,Zr)O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0 - 1	7440-67-7
Ce	0 - 1	7440-45-1

RN 213667-74-4 HCA
CN Cerium zirconium oxide (Ce0.81Zr0.19O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.19	7440-67-7
Ce	0.81	7440-45-1

RN 352711-60-5 HCA
CN Cerium zirconium oxide (Ce0.54Zr0.46O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.46	7440-67-7
Ce	0.54	7440-45-1

RN 352711-61-6 HCA
CN Cerium zirconium oxide (Ce0.23Zr0.77O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.77	7440-67-7
Ce	0.23	7440-45-1

CC **72-2** (Electrochemistry)
Section cross-reference(s): 73, 75
IT **135495-52-2P**, Cerium zirconium oxide ((Ce,Zr)O2)
213667-74-4P, Cerium zirconium oxide Ce0.81Zr0.19O2
352711-60-5P, Cerium zirconium oxide (Ce0.54Zr0.46O2)
352711-61-6P, Cerium zirconium oxide (Ce0.23Zr0.77O2)
(characterization of Ce1-xZrxO2 thin films prepd. by pyrolytic spray technique)

L58 ANSWER 29 OF 62 HCA COPYRIGHT 2006 ACS on STN
132:99494 Optically passive cerium containing counter-electrodes for electrochromic devices. Varsano, F.; Decker, F.; Masetti, E. (University of Rome "La Sapienza" Chemistry Dep., Rome, 5I-00185, Italy). Ionics, 5(1 & 2), 80-85 (English) **1999**. CODEN: IONIFA. ISSN: 0947-7047. Publisher: Institute for Ionics.
AB Electrochem. and optical behavior of sputter deposited CeO2, Ce-Zr mixed oxide and Ce-V mixed oxide thin films are reported. The films were deposited starting from a target prepd. by mixing and weakly

pressing the oxide powders in the desired molar ratio. Li intercalation was accomplished from a liq. electrolyte. CeO2 and Ce-Zr mixed oxide thin films are transparent in the visible range and behave as passive material upon oxidn./redn. During the cyclic voltammetries performed on the thin films a charge of few mC was reversibly cycled. The diffusion coeff. was evaluated from galvanostatic intermittent titrn. technique (GITT) expts. Ce-V mixed oxide thin films showed a mixed anodic/cathodic behavior passing through a transparent state. The charge reversibly inserted during cyclic voltammetry at 10 mV/s was .ltoreq.22 mC/cm2 for a 107 nm thick film and ranks Ce-V mixed oxide among the most promising materials for electrochromic devices.

IT **65453-23-8**, Cerium zirconium oxide
(electrochem. and optical behavior of sputter deposited CeO2, Ce-Zr mixed oxide and Ce-V mixed oxide thin film: optically passive cerium contg. counter-electrodes for electrochromic devices)

RN 65453-23-8 HCA

CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC **72-2** (Electrochemistry)
Section cross-reference(s): 73, 74, 78

IT 1306-38-3, Cerium oxide (CeO2), uses 12643-01-5, Cerium vanadium oxide **65453-23-8**, Cerium zirconium oxide
(electrochem. and optical behavior of sputter deposited CeO2, Ce-Zr mixed oxide and Ce-V mixed oxide thin film: optically passive cerium contg. counter-electrodes for electrochromic devices)

L58 ANSWER 32 OF 62 HCA COPYRIGHT 2006 ACS on STN

131:136702 Mixed cerium/titanium and cerium/zirconium oxides as thin-film counter electrodes for solid-state electrochromic transmissive devices. Macrelli, Guglielmo; Poli, Elisabetta (R and D Department via A. Volta, Isoclima SpA, Este, 35042, Italy). Electrochimica Acta, 44(18), 3137-3147 (English) **1999**. CODEN: ELCAAV. ISSN: 0013-4686. Publisher: Elsevier Science Ltd..

AB Optically passive thin films of mixed cerium/titanium and cerium/zirconium oxides were prepd. by electron-beam reactive evapn. Different oxidn. levels were achieved using different oxygen flows in the deposition process. The samples were optically and electrochem. characterized. Performances are discussed in view of

utilization in electrochromic devices as thin-film counter electrodes. Different materials were tested to identify the best soln. to be used as optically passive ion storage layers in existing electrochromic devices in alternative to optically active V2O5 counter electrodes. Process conditions and materials performances are reported, related to each other and discussed. Development studies are still in progress towards the optimization of the devices and their future scaling up.

IT **65453-23-8P**, Cerium zirconium oxide
(films; prepd. by electron-beam CVD and used as counter electrodes for electrochromic devices)

RN 65453-23-8 HCA

CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): **72**

IT 39406-95-6P, Cerium titanium oxide **65453-23-8P**, Cerium zirconium oxide
(films; prepd. by electron-beam CVD and used as counter electrodes for electrochromic devices)

L58 ANSWER 33 OF 62 HCA COPYRIGHT 2006 ACS on STN

131:122842 Optical and electrochemical properties of cerium-zirconium mixed oxide thin films deposited by sol-gel and r.f. sputtering. Varsano, F.; Decker, F.; Masetti, E.; Cardellini, F.; Licciulli, A. (Department of Chemistry, University of Rome 'La Sapienza', Rome, 00185, Italy). Electrochimica Acta, 44(18), 3149-3156 (English) **1999**. CODEN: ELCAAV. ISSN: 0013-4686. Publisher: Elsevier Science Ltd..

AB Films of Ce-Zr mixed oxide were produced by sol-gel and r.f. sputtering. These films can be used as 'passive' counter-electrodes in electrochromic smart windows because they retain their full transparency in both the oxidized and reduced state. Li intercalation was accomplished electrochem. using a liq. electrolyte. Electrochem. behavior of the samples was found to be dependent on the heat treatment (sol-gel deposited film) and crystallite orientation (sputter deposited films). XRD anal. on sputter deposited films showed that the films are cryst. and grow following the orientation of the underlying tin doped indium oxide (ITO) film. Films of Ce-Zr mixed oxide lacking in (111) crystallite

orientation show continuous evolution of the voltammograms and reach a max. value for the cycled charge only after a large no. of cycles. The lithium diffusion coeff., calcd. from GITT measurements, is in the range 10-12-10-14 cm2-s-1 for sputter deposited films and becomes as low as 10-15 cm2-s-1 for sol-gel deposited films. Optical consts. of the thin films were calcd. from reflectance and transmittance spectra. Refractive index values are in the range of 2.15-2.30 at .lambda. = 633 mn depending on the deposition method. A sharp absorption edge at about 320 nm is seen in accordance with CeO2 optical properties.

IT **65453-23-8**, Cerium zirconium oxide
(optical and electrochem. properties of cerium-zirconium mixed oxide thin films deposited by sol-gel and r.f. sputtering)

RN 65453-23-8 HCA

CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): **72**, 73

IT 1306-38-3, Ceria, properties 1314-23-4, Zirconia, properties
65453-23-8, Cerium zirconium oxide
(optical and electrochem. properties of cerium-zirconium mixed oxide thin films deposited by sol-gel and r.f. sputtering)

L58 ANSWER 34 OF 62 HCA COPYRIGHT 2006 ACS on STN

130:199846 Synthesis of zirconia-based solid electrolyte powders by the coprecipitation technique. Muccillo, E. N. S.; Muccillo, R.; Avila, D. M. (Instituto Pesquisas Energeticas Nucleares, Comissao Nacional Energia Nuclear, Sao Paulo, 05422, Brazil). Materials Science Forum, 299-300(Advanced Powder Technology), 70-79 (English) **1999**. CODEN: MSFOEP. ISSN: 0255-5476. Publisher: Trans Tech Publications Ltd..

AB The copptn. technique was used to obtain ZrO2-MgO (from ZrOCl2 + MgCl2) and ZrO2-CeO2 (from ZrOCl2 + Ce(NO3)3) powders with suitable purity and sinterability, resp. The powder mixing technique was used for comparison purposes. Cylindrical pellets were prepd. by uniaxial and cold isostatic pressing. The characterization of the sintered pellets were carried out by impedance spectroscopy (at 472 and 460.degree.), SEM, and XRD. ZrO2-MgO ceramics with a high degree of purity were obtained (sintering performed at 1450.degree. for 2 h, followed by 1700.degree. for 1 h in air). For the

ZrO2-CeO2 system, sintered pellets (1500.degree., 2 h) with 98% of the theor. d., and 0.5 .mu.m av. grain size were obtained.

IT **65453-23-8P**, Cerium zirconium oxide
(prepn. of zirconia-based solid electrolyte powders by copptn. technique)

RN 65453-23-8 HCA

CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC 57-2 (Ceramics)
Section cross-reference(s): **52**

IT 39318-32-6P, Magnesium zirconium oxide **65453-23-8P**, Cerium zirconium oxide
(prepn. of zirconia-based solid electrolyte powders by copptn. technique)

L58 ANSWER 36 OF 62 HCA COPYRIGHT 2006 ACS on STN

130:175737 Zr-Ce oxides as candidates for optically passive counterelectrodes. Veszelei, M.; Mattsson, M. Stromme; Kullman, L.; Azens, A.; Granqvist, C. G. (The Angstrom Laboratory, Department of Materials Science, Uppsala University, Uppsala, S-75121, Swed.). Solar Energy Materials and Solar Cells, 56(3-4), 223-230 (English) **1999**. CODEN: SEMCEQ. ISSN: 0927-0248. Publisher: Elsevier Science B.V..

AB Zr-Ce oxide films with compns. from pure Zr oxide to pure Ce oxide were made by reactive d.c. magnetron co-sputtering. The compn. and structure were detd. by RBS and x-ray diffraction. Pure Ce oxide films have high charge capacity and are optically passive under charge insertion; they are, however, chem. unstable in an electrolyte of LiClO4 in propylene carbonate. Pure Zr oxide has practically zero charge capacity. Zr-Ce oxide films have high (above 80%) optical transmittance, high charge capacity, and good chem. stability. These films remain fully transparent irresp. of their degree of lithiation, which may be reconciled with electrons accommodating 4f-states of Ce.

IT **135495-52-2**, Cerium zirconium oxide ((Ce,Zr)O2)
(as optically passive counterelectrodes)

RN 135495-52-2 HCA

CN Cerium zirconium oxide ((Ce,Zr)O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number

O	2	17778-80-2
Zr	0 - 1	7440-67-7
Ce	0 - 1	7440-45-1

CC 76-2 (Electric Phenomena)
Section cross-reference(s): **52**, 74
IT **135495-52-2**, Cerium zirconium oxide ((Ce,Zr)O2)
(as optically passive counterelectrodes)

L58 ANSWER 41 OF 62 HCA COPYRIGHT 2006 ACS on STN
128:197990 Optical and electrochemical properties of Li+ intercalated Zr-Ce oxide and Hf-Ce oxide films. Veszelei, M.; Kullman, L.; Stro/mme Mattsson, M.; Azens, A.; Granqvist, C. G. (Department of Materials Science, Uppsala University, P.O. Box 534, Uppsala, S-751 21, Swed.). Journal of Applied Physics, 83(3), 1670-1676 (English) **1998**. CODEN: JAPIAU. ISSN: 0021-8979. Publisher: American Institute of Physics.
AB Sputter deposited Zr-Ce oxide and Hf-Ce oxide films were studied with regard to structure, optical absorption, and electrochem. properties. X-ray diffractometry and Rutherford backscattering spectrometry showed that polycryst. Zr-Ce oxide and Hf-Ce oxide films had cubic crystal structures for 40-100 mol CeO2 and 50-100 mol CeO2, resp. Cyclic voltammetry was performed in an electrolyte of propylene carbonate contg. LiClO4. The charge capacity was .apprx.60 mC/cm2.mu.m for a Zr-Ce oxide film with a Ce/Zr atom ratio of .apprx.13 as well as for a Hf-Ce oxide film with a Ce/Hf atom ratio of .apprx.2. A decrease of the charge capacity was noted after .apprx.1000 voltammetric cycles, with the mixed oxide films being far more stable than CeO2. In situ optical transmittance measurements showed that both Zr-Ce and Hf-Ce oxide films remained essentially transparent during Li+ intercalation. Chronopotentiometry measurements were used to elucidate effects of the electronic structure during Li+ intercalation.
IT **39319-49-8D**, Cerium zirconium oxide (Ce0.4Zr0.6O2), oxygen excess **53169-24-7D**, Cerium zirconium oxide (Ce0.5Zr0.5O2), oxygen excess **65453-23-8D**, Cerium zirconium oxide, oxygen excess **115232-99-0D**, Cerium zirconium oxide (Ce0.75Zr0.25O2), oxygen excess **140418-71-9D**, Cerium zirconium oxide (Ce0.6Zr0.4O2), oxygen excess **182264-32-0D**, Cerium zirconium oxide (Ce0.93Zr0.07O2), oxygen excess **203713-40-0D**, Cerium zirconium oxide (Ce0.94Zr0.06O2), oxygen excess **203713-41-1D**, Cerium zirconium oxide (Ce0.86Zr0.14O2), oxygen excess **203713-42-2D**, Cerium zirconium oxide (Ce0.46Zr0.54O2), oxygen excess
(optical and electrochem. properties of lithium monocation intercalated cerium zirconium oxide and cerium hafnium oxide films)

RN 39319-49-8 HCA
CN Cerium zirconium oxide (Ce0.4Zr0.6O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.6	7440-67-7
Ce	0.4	7440-45-1

RN 53169-24-7 HCA
CN Cerium zirconium oxide (CeZrO4) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

RN 65453-23-8 HCA
CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

RN 115232-99-0 HCA
CN Cerium zirconium oxide (Ce0.75Zr0.25O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.25	7440-67-7
Ce	0.75	7440-45-1

RN 140418-71-9 HCA
CN Cerium zirconium oxide (Ce0.6Zr0.4O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.4	7440-67-7

Ce	0.6	7440-45-1

RN 182264-32-0 HCA
CN Cerium zirconium oxide (Ce0.93Zr0.07O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.07	7440-67-7
Ce	0.93	7440-45-1

RN 203713-40-0 HCA
CN Cerium zirconium oxide (Ce0.94Zr0.06O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.06	7440-67-7
Ce	0.94	7440-45-1

RN 203713-41-1 HCA
CN Cerium zirconium oxide (Ce0.86Zr0.14O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.14	7440-67-7
Ce	0.86	7440-45-1

RN 203713-42-2 HCA
CN Cerium zirconium oxide (Ce0.46Zr0.54O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.54	7440-67-7
Ce	0.46	7440-45-1

CC 73-3 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): **72**, 75, 76
IT 1306-38-3D, Cerium oxide (CeO2), oxygen excess, properties
1314-23-4D, Zirconium oxide (ZrO2), oxygen excess, properties
12055-23-1D, Hafnium oxide (HfO2), oxygen excess **39319-49-8D**

, Cerium zirconium oxide ($Ce0.4Zr0.6O2$), oxygen excess **53169-24-7D**, Cerium zirconium oxide ($Ce0.5Zr0.5O2$), oxygen excess **65453-23-8D**, Cerium zirconium oxide, oxygen excess 104365-48-2D, Hafnium zirconium oxide, oxygen excess **115232-99-0D**, Cerium zirconium oxide ($Ce0.75Zr0.25O2$), oxygen excess 116098-16-9D, Hafnium zirconium oxide ($Hf0.5Zr0.5O2$), oxygen excess **140418-71-9D**, Cerium zirconium oxide ($Ce0.6Zr0.4O2$), oxygen excess **182264-32-0D**, Cerium zirconium oxide ($Ce0.93Zr0.07O2$), oxygen excess **203713-40-0D**, Cerium zirconium oxide ($Ce0.94Zr0.06O2$), oxygen excess **203713-41-1D**, Cerium zirconium oxide ($Ce0.86Zr0.14O2$), oxygen excess **203713-42-2D**, Cerium zirconium oxide ($Ce0.46Zr0.54O2$), oxygen excess 203713-43-3D, Hafnium zirconium oxide ($Hf0.67Zr0.33O2$), oxygen excess 203713-44-4D, Hafnium zirconium oxide ($Hf0.33Zr0.67O2$), oxygen excess
(optical and electrochem. properties of lithium monocation intercalated cerium zirconium oxide and cerium hafnium oxide films)

L58 ANSWER 48 OF 62 HCA COPYRIGHT 2006 ACS on STN
117:154544 Stabilized zirconia solid electrolytes and their manufacture. Iwasaki, Hiroyuki; Yoshida, Toshihiko; Tagaya, Noriaki; Mukaisawa, Isao; Sakurada, Satoshi (Tonen Corp., Japan; Zaidan Hojin Sekiyu Sangyo Kasseika Center). Jpn. Kokai Tokkyo Koho JP 04139063 A2 **19920513** Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1990-262650 19900929.

AB The electrolytes are stabilized $ZrO2$ contg. metal oxides forming a solid soln. of with the stabilized $ZrO2$ at the intergranular boundary phase of the stabilized $ZrO2$ particles. The electrolytes are prepd. by mixing stabilized $ZrO2$ powder with metal alkoxides, metal salts, or submicron metal or metal oxide powder, shaping the mixt., and sintering. $Y2O3$-stabilized $ZrO2$ electrolytes contg. $CeO2$ and MgO had higher strength than those without the additives, and are useful for fuel cells.

IT **127860-57-5**, Cerium zirconium oxide ($Ce0.12Zr0.88O2$)
(electrolytes contg., stabilized zirconia, for fuel cells, for strength)

RN 127860-57-5 HCA

CN Cerium zirconium oxide ($Ce0.12Zr0.88O2$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.88	7440-67-7
Ce	0.12	7440-45-1

IC ICM C04B035-48
ICS H01M008-12
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel **cell** zirconia **electrolyte**; magnesia zirconia fuel **cell electrolyte**; ceria zirconia fuel **cell electrolyte**; yttria stabilized zirconia electrolyte
IT Fuel-**cell electrolytes**
(zirconia, stabilized, ceria and magnesia in, for strength)
IT 1306-38-3, Cerium dioxide, uses 1309-48-4, Magnesia, uses
116590-73-9, Magnesium zirconium oxide ($Mg_{0.09}Zr_{0.91}O_{1.91}$)
121130-03-8, Cerium yttrium oxide ($Ce_{0.85}Y_{0.15}O_{1.93}$)
127860-57-5, Cerium zirconium oxide ($Ce_{0.12}Zr_{0.88}O_2$)
(electrolytes contg., stabilized zirconia, for fuel cells, for strength)
IT 64417-98-7, Yttrium zirconium oxide
(**electrolytes**, for fuel **cells**, ceria and magnesia in, for strength)
IT 1314-23-4, Zirconia, uses
(yttria-stabilized, **electrolytes**, for fuel **cells**, ceria and magnesia in, for strength)
IT 1314-36-9, Yttria, uses
(zirconia stabilized with, **electrolytes**, for fuel **cells**, ceria and magnesia in, for strength)

L58 ANSWER 49 OF 62 HCA COPYRIGHT 2006 ACS on STN
116:177632 Electrical properties of zirconia-ceria system. Chiodelli, G.; Magistris, A.; Scagliotti, M. (CSTE, CNR, Pavia, 27100, Italy). Comm. Eur. Communities, [Rep.] EUR, EUR 13564, Proc. Int. Symp. Solid Oxide Fuel Cells, 2nd, 1991, 417-20 (English) **1991**. CODEN: CECED9. ISSN: 0303-755X.
AB In the ZrO_2:CeO_2 system, the elec. properties of 50-90 mol% CeO_2 compn. range have been investigated by using impedance spectroscopy under different O partial pressures (from air to 10^{-4} atm). The ionic transference no. at high temp. (700-1000.degree.) has been measured by the open circuit emf. method applied under O pressure gradient. Owing to their elec. properties, they have been proposed as solid electrolytes for solid oxide fuel cells, O semipermeable membranes for steam electrolysis, and hot electrodes for MHD systems.
IT **53169-24-7**, Cerium zirconium oxide ($CeZrO_4$)
140418-71-9, Cerium zirconium oxide ($Ce_{0.6}Zr_{0.4}O_2$)
140418-72-0, Cerium zirconium oxide ($Ce_{0.7}Zr_{0.3}O_2$)
140418-73-1, Cerium zirconium oxide ($Ce_{0.8}Zr_{0.2}O_2$)
140418-74-2, Cerium zirconium oxide ($Ce_{0.9}Zr_{0.1}O_2$)
(elec. properties of)
RN 53169-24-7 HCA
CN Cerium zirconium oxide ($CeZrO_4$) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

RN 140418-71-9 HCA
CN Cerium zirconium oxide (Ce0.6Zr0.4O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.4	7440-67-7
Ce	0.6	7440-45-1

RN 140418-72-0 HCA
CN Cerium zirconium oxide (Ce0.7Zr0.3O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.3	7440-67-7
Ce	0.7	7440-45-1

RN 140418-73-1 HCA
CN Cerium zirconium oxide (Ce0.8Zr0.2O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.2	7440-67-7
Ce	0.8	7440-45-1

RN 140418-74-2 HCA
CN Cerium zirconium oxide (Ce0.9Zr0.1O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.1	7440-67-7
Ce	0.9	7440-45-1

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57, 72, 76
ST zirconia ceria system elec property; fuel **cell** zirconia ceria **electrolyte**; steam electrolysis membrane zirconia ceria; MHD electrode zirconia ceria system
IT **53169-24-7**, Cerium zirconium oxide (CeZrO4)
140418-71-9, Cerium zirconium oxide (Ce0.6Zr0.4O2)
140418-72-0, Cerium zirconium oxide (Ce0.7Zr0.3O2)
140418-73-1, Cerium zirconium oxide (Ce0.8Zr0.2O2)
140418-74-2, Cerium zirconium oxide (Ce0.9Zr0.1O2)
(elec. properties of)

L58 ANSWER 50 OF 62 HCA COPYRIGHT 2006 ACS on STN
115:12382 Stabilized zirconia solid electrolyte and its manufacture. Iwasaki, Hiroyuki; Ishizaki, Fumiya; Yoshida, Toshihiko; Tagaya, Nobuaki; Mukaizawa, Isao; Seto, Hiroshi (Tonen Co., Ltd., Japan; Petroleum Energy Center). Eur. Pat. Appl. EP 414575 A1 **19910227**, 9 pp. DESIGNATED STATES: R: BE, DE, FR, GB. (English). CODEN: EPXXDW. APPLICATION: EP 1990-309394 19900828. PRIORITY: JP 1989-217539 19890825; JP 1989-253760 19890930.
AB The solid electrolyte comprises stabilized ZrO2 particles and <30 (0.01-5 wt.%) metal oxide dispersed within grains and/or grain boundaries of the ZrO2 particles. The metal oxide is Al2O3, Cr2O3, mullite, MgO, and/or a rare earth oxide, etc. and the av. particle sizes of the stabilized ZrO2 and the metal oxide are >1 and <1 .mu.m. The solid electrolyte is manufd. by molding and firing a slurry of stabilized ZrO2 powder and a metal alkoxide or salt. The solid electrolyte has a high mech. strength without lowering the O ion cond., and is used in solid-**electrolyte** fuel **cells**.
IT **127860-57-5**, Cerium zirconium oxide (Ce0.12Zr0.88O2)
(zirconia stabilized with, solid **electrolyte**, for fuel **cells**)
RN 127860-57-5 HCA
CN Cerium zirconium oxide (Ce0.12Zr0.88O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.88	7440-67-7
Ce	0.12	7440-45-1

IC ICM H01M008-12
ICS C04B035-48; C01G025-02
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57
ST zirconia stabilized solid electrolyte manuf; solid

electrolyte fuel **cell**; alumina stabilized zirconia solid electrolyte; chromia stabilized zirconia solid electrolyte; mullite stabilized zirconia solid electrolyte; magnesia stabilized zirconia solid electrolyte; rare earth oxide stabilized zirconia

IT Rare earth oxides
(zirconia stabilized with, solid **electrolyte**, for fuel **cells**)

IT Electric conductivity and conduction
(ionic, of stabilized zirconia solid **electrolyte**, for fuel **cells**)

IT Fuel **cells**
(solid-**electrolyte**, performance of)

IT 555-31-7, Aluminum isopropoxide 13473-90-0, Aluminum nitrate
(in manuf. of stabilized zirconia solid **electrolyte**, for fuel **cells**)

IT 64417-98-7, Yttrium zirconium oxide
(solid **electrolyte**, for fuel **cells**)

IT 1314-23-4, Zirconia, uses and miscellaneous
(yttria-stabilized, solid **electrolyte**, for fuel **cells**)

IT 1302-93-8, Mullite 1304-76-3, Bismuth oxide, uses and miscellaneous 1305-78-8, Calcia, uses and miscellaneous 1306-38-3, Ceria, uses and miscellaneous 1308-38-9, Chromia, uses and miscellaneous 1309-48-4, Magnesia, uses and miscellaneous 1314-20-1, Thoria, uses and miscellaneous 1314-36-9, Yttria, uses and miscellaneous 1344-28-1, Alumina, uses and miscellaneous 1344-57-6, Urania, uses and miscellaneous 13463-67-7, Titania, uses and miscellaneous 116590-73-9, Magnesium zirconium oxide ($Mg_{0.09}Zr_{0.91}O_{1.91}$) 121130-03-8, Cerium yttrium oxide ($Ce_{0.85}Y_{0.15}O_{1.93}$) **127860-57-5**, Cerium zirconium oxide ($Ce_{0.12}Zr_{0.88}O_2$)
(zirconia stabilized with, solid **electrolyte**, for fuel **cells**)

L58 ANSWER 53 OF 62 HCA

89:200319 Studies of zirconia-ceria base ceramic for MHD channel electrodes. Telegin, G. P.; Romanov, A. I.; Akopov, F. A.; Gokhstein, Ya. P.; Keler, E. K.; Borodina, T. I.; Bakunov, V. S.; Schneider, S.; Rossing, B.; et al. (USSR). U.S.-U.S.S.R. Colloq. Magnetohydrodyn. Electr. Power Gener., [Proc.], 3rd, Issue CONF-761015, 357-77. NTIS: Springfield, Va. (English) **1976**
. CODEN: 38ABAY.

AB The results obtained with ZrO_2-(18-75) CeO_2, ZrO_2-78 CeO_2-2 Ta_2O_5, and ZrO_2-12 CeO_2-3 mol% Y_2O_3 are reported. Elec. cond., thermal cond., thermal diffusivity, thermal expansion, thermal stability, and the V-A characteristics were detd. The electrode compns. were also tested in a magnetohydrodynamic (MHD) channel at the operation mode of: plasma temp. 2573 K, combustion product mass flow rate 0.75

kg/s, static pressure 0.83 atm, K concn. in the plasma 1%, electrode surface temp. 1983 K, and total operating time 127 h. Decompn. of the solid solns. occurred in both the cathodes and the anodes and was esp. notable in electrodes not under current. The major decompn. products are discussed.

IT **12157-80-1P**
(formation of, in ceria-zirconia ceramic magnetohydrodynamic electrode)

RN 12157-80-1 HCA

CN Cerium zirconium oxide ($Ce_2Zr_2O_7$) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC **52-2** (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 57, 69

IT **12157-80-1P** 68335-81-9P
(formation of, in ceria-zirconia ceramic magnetohydrodynamic electrode)

L58 ANSWER 55 OF 62 HCA COPYRIGHT 2006 ACS on STN

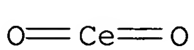
82:37721 Measurement of the oxygen ion transport number in **oxygen** ion-**electron** mixed conductors. Suzuki, Yutaka; Takahashi, Takehiko (Fac. Eng., Nagoya Univ., Nagoya, Japan). Denki Kagaku oyobi Kogyo Butsuri Kagaku, 42(9), 467-71 (Japanese) **1974**. CODEN: DKOKAZ. ISSN: 0366-9297.

AB The polarization resistance (R1) at the electrode was considered in constructing an equiv. circuit for the O concn. cell with a solid state mixed conductor. The electronic resistance Re was in parallel with the potential of the idealized cell Eth, ionic resistance Ri and R1. Therefore Re was obtained by applying the blocking voltage Eth. Furthermore Ri was divided into the pure ionic resistance R3 and the grain boundary resistance R2. Both R1 and R2 possess capacitances in parallel. By measuring the total impedance of the cell from 20 Hz to 20 KHz, each resistivity was detd. independently. The ion transference no. ti,1 thus detd. was independent of the electrode conditions or electrode materials, while that detd. by single open circuit voltage measurement was nonreproducible. Various solid solns. of **ZrO_2**, ThO_2 and **CeO_2** were used as the mixed conductor and variously heat treated electrodes of Pt, Ag and Au were examd.

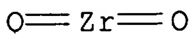
IT **1306-38-3D, Cerium oxide (CeO_2**), solid soln. with oxides **1314-23-4D, Zirconium oxide** (**ZrO_2**), solid soln. with oxides
(oxygen ion transport no. in)

RN 1306-38-3 HCA

CN Cerium oxide (CeO_2) (8CI, 9CI) (CA INDEX NAME)



RN 1314-23-4 HCA
CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)



CC 76-2 (Electric Phenomena)
IT **1306-38-3D, Cerium oxide** (**CeO2**
), solid soln. with oxides 1314-20-1D, Thorium oxide (ThO2), solid soln. with oxides **1314-23-4D, Zirconium oxide** (**ZrO2**), solid soln. with oxides
(oxygen ion transport no. in)